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THE YAKIMA SANITARY CAMPAIGN.

BEING A REVIEW OF A YEAR'S WORK AGAINST TYPHOID FEVER IN THE YAKIMA VALLEY AND THE RESULTS ACHIEVED.

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Read before the General Sessions, American Public Health Association, Washington, D. C. September, 1912.

North Yakima is the county seat of Yakima county in the state of Washington. It is advantageously situated at a point where several valleys converge near the confluence of the Naches and Yakima rivers about ninety miles from the Columbia River into which the Yakima empties.

Originally a small village known only as a shipping point for cattle, sheep, hay and hops, it has grown in twenty years to be the center of one of the most fertile irrigation sections of the United States acquiring considerable fame as a fruit center.

Today it is a city of about 17,000 population. The surrounding country for several miles in every direction is cut up into small farms of from 5 to 40 acres and the dense rural population has such facilities of transportation and communication with the city as to make it practically suburban. The soil is a light volcanic ash of a varying depth overlaying a loose gravel formation. The ground water level rises and falls as much as 15 or 20 feet with the beginning and cessation of irrigation reaching its highest in August and its lowest about February.

The climate is mild, winters short with little snow, an early spring, a long dry summer and a late fall. The average annual precipitation is frequently less than 7 inches.

SANITARY CONDITIONS.

The water supply is taken from the Naches River into an open canal coursing about 8 miles through irrigated cultivated lands, then through

about 12 miles of pipes to the city where it is distributed to about three-fourths of the population. About one-fourth of the people depend upon shallow wells, many of which are dry during the winter months.

A water carriage sewerage system accommodates probably less than three-fourths of the city and the sewage empties into the Yakima River about 3 miles above the intake of two large irrigation canals. The rest of the city has open privies and a few cesspools not water tight but draining directly in the subsoil.

There is an unusually large number of horses and cows housed for the most part in mere sheds or very poorly constructed stables, and a proportionately large number of flies, during the long summer season.

The milk, cream and butter supply is derived from dairies within a radius of thirty miles, shipped in by train from the more distant points and from the nearer farms by wagon.

Four creameries supply ice cream, cream and butter, and three of these also retail and wholesale milk. There are also four retail milk dealers dispensing milk from their own herds while many families are supplied from the neighbor's cow.

There are no factories but during August, September and October thousands of men, women and children gather in temporary camps in nearby rural districts harvesting fruit and hops.

Typhoid Prevalence.

There is no reliable source from which to secure complete data concerning the prevalence of any disease prior to the year 1911.

Dr. Elmer E. Heg, late Commissioner of Health for the state of Washington, reports typhoid fever as of frequent occurrence in North Yakima over twenty years ago.

In 1904 the State Board of Health detailed Dr. Rose A. Bebb to examine and report upon the prevalence of Typhoid Fever in and near North Yakima, her report appearing in the "Fifth Biennial Report of the Washington State Board of Health." In about six months there were investigated 298 cases of which 190 gave positive Widal tests and of these 190, no less than 121 were developed in North Yakima, then a city of about 6,000 people, one case for every 50 persons in the city.

In 1910, Dr. Eugene R. Kelley and Mr. T. R. Wilber of the State Board of Health made another study reporting at length in "Studies in Typhoid Fever by the Washington State Board of Health, 1909–1910." During the last half of June and the entire months of July, August, September and October they observed 163 cases of typhoid fever of which 124 were among residents.

More accurate and complete records are obtainable of the deaths from typhoid in North Yakima beginning with the year 1908. In that year

there were 26 deaths from that disease or about 12 per cent. of the deaths from all causes.

In 1909 there were 19 typhoid deaths, about 8 per cent. of all deaths.

In 1910 there were 31 typhoid deaths or over 12 per cent. of all deaths. Bulletin No. 109 of the Bureau of the Census in the "Mortality Statistics for 1910" gives North Yakima a death rate from all causes of 18 per thousand of population, and a typhoid death rate of 237.6 per 100,000.

In May, 1911, a sudden outbreak of typhoid occurred with some 60 cases confined entirely to the eastern part of the city and attracted considerable attention because it was two or three months earlier than the usual time for that disease to appear and because it covered only a small portion of the city while no cases appeared in the western part of the city, which in previous years seemed to be most affected. Three of these cases died.

This outbreak marked the end of a long period of patient submission to an apparently inevitable annual scourge. The immediate outcome was an agitation started and fostered by the medical profession, aided by the business organizations and Women's Clubs and strongly supported by the daily press.

This resulted in bringing together the city, county and state health authorities to confer on the best means of dealing with the outbreak then prevalent as well as with the annual typhoid prevalence in the city and county.

Organization.

Prior to July 1, 1911 there was practically no health organization. Each incorporated town had a health officer appointed annually by the Mayor usually at a ridiculously small salary and with little or no facilities for doing any effective work. The county health officer appointed biennially looked after sanitary matters in the unincorporated parts of the county, and had nominal jurisdiction over all local health officers. He also had charge of all indigent sick.

It was decided to appoint one health officer for the City of North Yakima and for Yakima county at a salary sufficient to enable him to devote his entire time to matters of public health. A laboratory was equipped, a bacteriologist appointed, a visiting nurse and a force of sanitary inspectors placed at the health officers disposal.

At the request of State Health Commissioner Heg, Dr. L. L. Lumsden was detailed from the Public Health Service to investigate typhoid fever in the Yakima Valley and when he arrived on June 19, he found a reasonably efficient organization to assist in his work, a most interesting account of which is given in Public Health Bulletin No. 51.

A personal canvas was made and every person visited who had recently had typhoid fever, a clinical history obtained and filed at the health office.

In the city an extra force of scavengers was put to work and a general clean-up was ordered of back yards, vacant lots and alleys.

The health office was equipped with models of sanitary privies, manure boxes, garbage cans, and fly traps and these were exhibited and explained to the people who came to the office in an almost constant stream having been sent there by the sanitary inspectors, or coming in response to an invitation by mail or through the press. Lectures were given in the churches, schools, and other public places where these models were shown and their need explained to the people.

Sanitation was preached from every pulpit on a given Sunday and the Women's Clubs made it the subject of discussion at their meetings.

Commercial bodies were lectured on the profits accruing to a community in the saving of lives and the conservation of earning power which would result if typhoid fever, a preventable disease, were kept out of the community.

Results.

Thus began a battle against filth and flies and for a better food and water supply that is still waging. Ordinances were passed:

(a) Fixing a bacteriological standard of purity for the municipal water supply.

(b) Fixing a standard of purity for milk and providing for the inspection of dairies.

(c) Regulating the sanitary conditions of all places where food products are stored, manufactured, served or offered for sale.

(d) Providing for meat inspection according to the standards of the Bureau of Animal Industry and prohibiting the sale of uninspected meats.

(e) Defining certain nuisances, prohibiting insanitary types of privies, making it compulsory to install tight garbage cans and fly tight manure boxes wherever needed.

With public sentiment in their favor these ordinances can be and are being generally enforced.

In the rural sections of a county which covers about 5,000 square miles such thoroughness is out of the question. But every case in the county suspected of being typhoid fever is visited by the health officer or a deputy, a complete case history taken, the sanitary conditions, food and water supply investigated and full directions given for bedside disinfection, screening the patient, protecting the food and water supply, disinfecting and disposing of excreta, sanitating privies, etc.

Blood is taken for making Widal tests or a culture in early cases, and a sample of water is brought in to be examined for colon bacillus.

All cases in the city or close in suburbs are visited at frequent intervals by a nurse in the Department's employ to insure the proper carrying out of the health officer's instructions.

Vaccination has not been generally employed but within the last few

months the State Board of Health has begun the free distribution of vaccine and its use is now recommended as a prophylactic in persons of a family or household where a case has developed.

With the limited hospital facilities it has been impossible to hospitalize all cases, but an effort is made to have as many as possible taken to a hospital.

As previously stated there are no means of ascertaining the number of typhoid fever cases occurring in the city or county for any period prior to the May-June epidemic of 1911.

There were under treatment June 30, 1911 in North Yakima, 33 cases. One of these died July 2. During the following 12 months there were 53 cases. In 19 of these, including 6 distinct contact cases, the disease was probably contracted in the city.

Thirty-four were cases clearly originating in the rural districts. Only one of the 53 was a fatal case and that was a man who had been driven in from the country about 40 miles.

Cases were promptly reported by the attending physician in the rural districts and smaller towns with one exception. It might be noted in passing that the only exception, a town of about 2,500 population had three cases of typhoid fever which were not reported till after death.

Including these three cases there were reported 88 cases as under treatment in the county outside of North Yakima and originating in the year ending June 30, 1912. Of these 88 cases, six were fatal. There were then in the entire county with a population of 50,000 people, 141 cases of typhoid fever with 8 deaths, during the year.

Owing to the insufficient records it is impossible to establish any very intelligent comparisons.

This much we know, viz., that for the twelve months preceding there were 64 deaths from typhoid or approximately 128 per 100,000 of population, as against 8 deaths or 16 per 100,000 in the first year of active work covering the entire county.

For the City of North Yakima the results are also striking. In the year ending June 30, 1911 there were 31 deaths from typhoid fever and but 2 in the 12 months following or less than 11.8 typhoid deaths per 100,000 of population, while the Bureau of the Census Bulletin No. 109 gives us for 1910 a rate of 237.6 per 100,000.

That the saving of lives was not confined to typhoid alone is shown by the fact that the deaths from all causes in the county fell from 538 to 393. For the City of North Yakima alone the deaths from all causes were reduced from 247 to 192, or 75 less deaths during the year of active work. Bulletin No. 109 previously cited gives North Yakima a death rate from all cases for 1910 of 18. per 1,000 of population; during the year ending June 30, 1912, the rate was approximately 10.12.

The work has been arduous and somewhat expensive, but the results have been most gratifying and the end is not yet.

RURAL TYPHOID IN MANITOBA.

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Chairman of Board of Health, Winnipeg, Canada.

Read before the General Sessions, American Public Health Association, Washington, D. C., September, 1912.

In Manitoba, as in all rapidly developing prairie countries, typhoid fever is the most important disease that the rural health officer has to deal with, and indeed for this bad eminence there is no near rival.

It is especially with the local conditions which favor the prevalence of this disease and make its control difficult, and with the steps which, in the author's opinion should be taken to meet these conditions, that this paper proposes briefly to deal.

Of the farmers of our Province it may be said that they are an intelligent class of men, most of them of Anglo-Saxon descent and very much of the same type as those you meet in your own Western States, but it is to be remembered that in a new country where many are practically beginning life and yet not too well provided with worldly gear, people are apt to be careless about things that are better attended to in older communities. There is also among them the deeply engrained idea that water is the sole vehicle for the infection of typhoid, and this belief, while perhaps it has kept attention from more culpable channels, has at least this good feature about it that it has in the majority of cases led to the well being placed at a safe distance from any possible source of contamination.

In my opinion, although by no means to be disregarded, water plays altogether a subordinate role in rural typhoid and is by no means the important factor one must admit that it is in cities or towns.

The location of the chief source of offense on these prairie farms needs no great acumen or skill, for even a most cursory examination reveals as a rule a condition of affairs, the most favorable that could be conceived of for the transmission of an intestine borne disease.

One encounters everywhere a surprising lack of appreciation of the importance of safely disposing of all human waste, as if in the pure country atmosphere such procedure was quite superfluous. In fact in many of these farms where any convenience is provided at all, it is generally of the crudest and most undesirable character, a shallow earth pit or the ordinary box closet with a rough unventilated superstructure, erected as a rule in the vicinity of the stables. These places are nearly always poorly attended to, being rarely cleaned or disinfected, and in the summer months from the stench and swarms of flies are indescribably forbidding.

In consequence, as one might expect, the stables and outhouses are often used as privies and urinals, and to make matters worse the fly-haunted

manure heap at the stable door, as being the driest place about the buildings is frequently also the favorite milking ground. Moreover it is only when the farm adjoins a lake or river that ice is procurable, and as screened milk houses are uncommon, this dangerous product receives no care or treatment that could abate one jot its power for evil. In such a state of affairs one has only to think of the possible advent of the Eberth bacillus, and he must have a poor imagination indeed who cannot conjure up the almost certain course of events.

There enters also here another factor that is not found in the East where mixed farming is the rule and where the population is comparatively stable. In these northern latitudes where the seasons are short, the staple product is generally wheat or other cereals, so that comparatively large tracts of land have to be cultivated. The sowing of the grain and its care during the summer is generally compassed by the farmer with the aid of the members of his own family, or at least with very little extra help; but in the autumn when the crop must be harvested and threshed in a few short weeks, much additional labor is required, and as a result during the latter part of August a vast army of harvesters, many thousands in number, is gathered from all parts of Canada and Northwestern states and scattered over the wheat belt. These men rarely work long at one place but are constantly moving about and later are gathered into threshing gangs that travel far and wide as their services are required.

Obviously a certain percentage of these men are bound to be convalescents from typhoid and some of them bacillus carriers, and you get to perfection the condition described by Hill as the "wandering infected intestine," and one with an unusually favorable path prepared for it.

When the disease is once established on one of these homesteads, the further spread is almost inevitable, as the rule is that the person who acts as nurse is perforce also the preparer of all the household food. Many cases arise in this way, for even where the physician takes the pains to detail the necessary precautions, on account of the poor facilities these can rarely be carried out effectively.

In considering these conditions which I have so succinctly outlined, it is evident that the first and most important thing is the proper disposal of all human excrementitious matter on these farms so that its transference by insect or other agencies is not possible. Nor can this matter be safely left to the individual, who rarely appreciates its importance and who is often difficult to convince, but should be the direct care of the municipal authorities. The health officer who now as a rule receives merely a retaining fee, with the understanding that his services are to be called for only in the case of epidemics, should be so renumerated that he may be expected to keep a supervision over the sanitary condition of his territory during the whole year. Under him should be a number of inspectors whose

duty it should be to visit each of these farms at intervals, and where there has been neglect to correct it; any expense so incurred to be charged up against the property. As in most cases a water service with septic tanks and filler beds is out of the question, the best arrangement is the deep cement pit with a fly proof superstructure, and this to supersede all pits and box closets. Where the expenditure entails any hardship, these changes should be made by the municipality and easy terms arranged for repayment.

The great obstacle in the way of this work will be to get the municipal authorities to undertake it, as they are apt to look askance at any proposed expenditure not connected with the improvements of roads, culverts, etc.

In order to furnish an object lesson, I have had in my mind to recommend that the Central Board of Health shall take several of these municipalities and at the general public expense put them into such sanitary condition with proper medical supervision, confident that such a step, with its almost certain results, will have more educational value than any possible amount of literature or verbal admonishment.

In regard to the itinerant bacillus carrier of whom we have spoken, the case is more difficult, as there is nothing to herald his arrival and the task of running him to ground is often a hopeless undertaking. However, in this respect, the Federal Board of Health, which we hope soon to see established may do much good in pressing for a bacteriological examination of the urine and fæces of convalescent patients in all Canadian hospitals, their discharge to be dependent on such examination. If such a rule were established, we think it must of necessity soon extend to all cases in private practice.

Where cases do arise in one of these rural households, they should, if possible, be removed to hospitals, or where this cannot be done, the greatest pains should be taken to apprise the other members of the family of the dangers incurred and of the prophylactic measures to be taken, something concerning which the medical practitioner is too often remiss.

In Anti-typhoid vaccination we have a potent agency for good, but one, whose use for various reasons will be for a long time limited, and it is besides to be remembered that no dependence on it should in any degree abate our efforts to attain conditions such as were evidently intended by nature, when nothing that our bodies have discarded as effete or waste, or nothing which has been derived from such matters can ever again re-enter them with our food.

A PLEA FOR A MORE WIDESPREAD INTEREST IN THE INVESTIGATION AND CONTROL OF TYPHOID FEVER.*

PART I.

DR. WILLIAM C. HANSON,

Assistant to the Secretary, State Board of Health of Massachusetts, Boston, Mass.

PART II.

DR. LYMAN A. JONES,

State Inspector of Health, Berkshire Health District, North Adams, Mass.

Read before the General Sessions, American Public Health Association, Washington, D. C., September, 1912.

PART I.

In view of all the preventive work against typhoid fever in this country, it is somewhat disturbing to learn that, with certain exceptions, our typhoid fever mortality rates do not even approach the low rates attained in the leading cities of northern and western Europe. The question arises therefore, whether, as a nation, we have yet really grasped the situation.

The registration area of the United States, with a population exceeding 53,000,000, or 58.3 per cent. of the whole, had an average typhoid mortality rate of 29.5 for the years 1901 to 1909 inclusive, more than six times the 1910 rate for the European cities.

In 1910 the registration area of the United States included 21 states. Not one of these states had a rate as low as 10 per 100,000. The lowest rate, 10.7 occurred in New Hampshire; the next lowest in Massachusetts, 12.4. Seven states had a rate less than 20, ranging from 12.4 to 19.2 per 100,000, while in the remaining 13 states the typhoid mortality rate varied from 20.3 to 57.5 in one of the southern states where figures were limited to municipalities with a population of 1,000 or more.

If we attempt to make a comparison of the cities in this country the result is equally unfavorable.

Recognizing the presence of typhoid fever to an extent that should be regarded as a national disgrace, it may be well [in making a plea for a more widespread public interest in the investigation and control of the disease],

*A preliminary report on this subject has been printed in the February, 1913, Bulletin of the State Board of Health of Massachusetts.

to refer to some of the factors in the problem, some of the obstacles to be overcome in attaining the results desired. The greatest obstacle of all is the indifference of the people themselves to the presence of the disease. That typhoid fever should recur from year to year, especially during the late summer and early fall is accepted as a matter of fact. It is the result of the season; an easy way to avoid responsibility.

Local health authorities and especially physicians themselves have failed to realize their responsibility in the prevention of the spread of typhoid fever. Instead of being alert and on the watch for the disease and seeking for possible means of preventing its spread, too many local health officials are disinterested and are satisfied to wait until the matter is forced upon their attention by the presence of an unusual number of cases in the community. Even then their efforts are spasmodic, and owing to inexperience and lack of system, inadequate.

Too many physicians fail to have any sense of responsibility to the community when they are called to attend a suspicious case which later proves to be typhoid fever. No one is notified; no effort is made to trace a possible source of infection; other members of the household may not even be warned of impending danger; no steps are taken to protect the community until diagnosis is fully established. In the interval much valuable time is lost which should have been employed in attempting to locate and prevent the source of infection, and the patient has been permitted to infect others.

Another factor of importance is the lack of funds with which to conduct preventive health work. Generally speaking, individuals and communities are unwilling to spend money for things which they consider useless. Neither are they willing as a rule to make expenditures which do not afford some show in results. The Health Department is the only municipal department which has no material to show for its expenditures, which has nothing to balance the debit side of the treasurer's account save bills and salaries. The school department has its school houses and playgrounds to show for its expenditures; the police department has its station houses and uniformed officers; the fire department has engines and firemen; the water department has its reservoirs and rents. The health department practically has none of these things. The epidemic prevented does not appeal in like spectacular manner to the citizens nor does it appear anywhere as earnings, hence small appropriations, if any, are grudgingly given. Still another reason which contributes to this lack of funds for health work is that active work in this line often means inconvenience or discomfort to the individual concerned. In his annoyance, the individual often regards the Board's action as persecution. The result is opposition rather than assistance of the individual or community.

Other factors entering into the attainment of the control of typhoid fever are associated with the disease itself, with its manner of distribution.

They include spread of infection by pollution of public and other water supplies, by contamination of milk and other food supplies. Contact infection is probably of greater importance than has been hitherto recognized. This is especially the case since it is known that contact during the early stages of the disease, before diagnosis is established, will spread infection.

A campaign for the control of typhoid fever will involve effort in several directions. In general it will be necessary to show the people that typhoid fever is a preventable disease and to impress this fact upon them. It will be necessary to make plain the avenues through which the disease reaches them. It will be necessary to explain how the infection may be avoided. When the public has once grasped the real situation, there will come a demand that local health boards be active, and funds will be obtainable for carrying on the work.

But because the education of the public is apt to be a slow process, it is necessary to stimulate local health authorities to a greater interest and activity. The local board of health should be urged to study their records, to tabulate them in various ways in order to determine the danger points, to locate the sections of community where the disease predominates and to learn why it predominates in such places, whether it is because there is no public water supply or because there is no provision for the disposal of sewage, or whether contact infection is responsible, owing to insanitary housing conditions.

Concurrently the local Board of Health should be urged to look up every case of disease to obtain a detailed sanitary history of every patient and to investigate for suggestions as to a possible source of infection. They should be required to see that proper precautions are taken to protect the public.

It is necessary also to impress upon physicians the fact that their coöperation is not only desired, but required; that they shall report all cases and suspected cases of the disease and report them promptly, and that they assume a grave moral responsibility to the community if they fail to notify the authorities of all suspicious cases, since these cases are often the means of spreading the disease while the physician is waiting to establish a diagnosis.

It is necessary to impress upon all persons the fact that convalescents from typhoid fever should be kept under observation until they are no longer eliminating typhoid bacilli. Eventually it will be recognized that persons should not be employed in dairies or in handling food, or serve as cooks or waitresses, or be employed in similar occupations, until it is known that they are free from typhoid germs.

Such educational and practical work can best be begun and carried on by central health organizations such as Public Health Service, State Boards of

Health and Boards of Health in the larger municipalities where the work is already well organized and where trained workers and funds are available.

That these organizations may do the work successfully it is desirable that they shall have authority, in case it is not already theirs, to require local health boards to do the work satisfactorily or else to permit others to do it for them.

In the State of Massachusetts, there are twelve health districts, each of which is in charge of a physician who is known legally as State Inspector of Health. All of the State Inspectors of Health, however, are under the supervision of the State Board of Health. From time to time, it has been the custom of the State Board of Health to assign to one or more of the State Inspectors of Health a special subject for investigation and report. Recognizing the importance of a thorough study of the prevalence of typhoid fever in the state, with the object of further preventing its spread, a committee of four State Inspectors of Health was recently given this task to perform. The members of the committee were Harry Linenthal, M. D., Boston, Charles E. Simpson, M. D., Lowell, William W. Walcott, M. D., Natick, and Lyman A. Jones, M. D., North Adams, In the performance of their work, the members of the committee were allowed to disregard the health district lines and to be assisted through the office of the State Board of Health by the other State Inspectors of Health. Dr. Jones, who is present at the meeting, will tell the members of the American Public Health Association something as to the committee's plan of work.

PART II.

A campaign against typhoid fever will of necessity be developed along several lines, over a considerable period of time if results are to be obtained.

To secure knowledge as to the distribution of the disease, the morbidity and mortality rates in the various cities and towns of the Commonwealth will be studied through a term of years. The committee will arrange to receive reports of cases as they occur throughout the state daily, and an effort will be made to secure a detailed account of every case, reported or discovered, using for this purpose a particular form of blank for recording details.

From the tabulations and the detailed information above suggested it will be possible to discover in what places typhoid fever is usually prevalent. An opportunity will thus be given for special investigation in such places to determine why it is so, and to map out plans for diminishing the customary amount. In this connection the water and sewerage systems will be considered, the character of the milk supplies will be determined, and any other special factors will be sought out. Much of this information already

exists, recorded in different places. An effort will be made to collate the same and to arrange it so that it will be readily accessible for study as to its bearing on this disease.

A study and record of the detailed information will also make possible the establishing of the relative importance of the different modes of infection, and growing out of such a study will arise suggestions as to the means of preventing infection, as to the management of carriers, etc.

Much of the work against typhoid will be educational. It will be necessary to convince the people, local boards of health and physicians even, that typhoid fever is a preventable disease; that to prevent it their active coöperation is needed; that suspicious cases should be reported early; and that the report of cases suspicious or irregular in type should not wait upon positive Widal tests, because this uncertain period, before a positive diagnosis is established, and when, as so generally occurs, no special precautions are observed, is practically the most dangerous of all from a preventive standpoint. These bases may afford the starting point of an outbreak, and one or two suspicious cases will often afford a clew as to the source of the infection.

The committee are of the opinion that the physician who does not report a case of continued fever as a probable typhoid, as soon as he had eliminated other common causes, assumes a moral responsibility to the community for any subsequent results in the community, if he has failed to take all the precautions which a qualified health officer would take when notified of the case.

The use of Widal tests and the bile cultures to determine the presence of bacilli in the blood, stools and urine, as an aid in making or confirming a diagnosis, should be encouraged.

It is the purpose of the committee to render available the information collected, by means of maps, card indices, etc.; to have frequent meetings to discuss and tabulate the information obtained; to inaugurate aggressive work in those places where typhoid fever has been prevalent, without waiting for the usual outbreak; and, in case there is any suggestion of an outbreak in a given locality, to have some one or more members of the committee visit that place at once to confer with the local authorities as to what measures may be taken to avert the threatened outbreak. Such work as has been suggested, persistently followed, cannot fail to produce favorable results.

SOME RELATIONS BETWEEN FILTERED WATER AND TYPHOID FEVER AS SHOWN IN THE TWO YEARS' SERVICE OF THE WILMINGTON FILTERS.

T. CHALKLEY HATTON.

Read before the Sanitary Engineering Section, American Public Health Association, Washington, D. C., September, 1912.

This brief description of the two years' work of the slow sand filters built at Wilmington, Deleware, is presented for two reasons. One is to show that the water delivered by a municipality to its consumers is not always responsible for typhoid fever, and the other is to present a graphical method of plotting the results of a filter, and their relation to typhoid fever, so that the unskilled citizen can interpret them.

The raw water for the City of Wilmington is taken from the Brandywine River, about two miles above its mouth. The population upon the Brandywine water shed consists of farmers only, with the exception of a few small villages of from 200 to 500 inhabitants, for about 30 miles above the intake for the water supply.

At this distance the Borough of Coatesville is built in a small valley crossing the Brandywine and draining into it. Coatesville has a population of about 11,000, is supplied with water for domestic purposes from a small creek running through the valley in which the borough is located, and discharges its sewage, without treatment, into the Brandywine River.

The water furnished to the City of Wilmington has been filtered through rapid filters for a number of years. During the early life of these rapid filters the effluent was good, and the city enjoyed a low typhoid fever rate. As the population increased, the capacity of the filters remained the same, thus the effluent diminished in purity until it was little better than the raw water.

During the last ten years of the life of these rapid filters the typhoid fever rate increased, and the water commissioners decided to build a new filter plant.

After very careful experiments were conducted by Dr. Albert Robin, covering a period of some two years, a scrubber was built. This is the first process through which the raw water goes, and consists of simply passing the water through beds of sea moss.

This intercepts the heavier solids in suspension and permits of a more rapid filtration through the filters.

After passing the scrubbers the water is pumped to an impounding reser-

voir large enough to hold from three to four days' supply. Here some precipitation is effected, and some biological purification occurs.

From the reservoir the water passes onto and through slow sand filters, of the downward type, at the rate of six million gallons per acre per day, thence to a clear water basin, holding about a day's supply, and from thence direct into the city's distribution mains.

In brief this is a very general description of the treatment given the consumers in the City of Wilmington from January 15, 1910, the date upon which the entire filter plant was put in operation, up to February 12, 1912.

Inasmuch as the filters were built for the purpose of eradicating typhoid fever, if possible, a very thorough plan was inaugurated of inspecting and reporting all typhoid fever cases, the City Board of Health coöperating with the officers of the Water Commissioners. It was hoped that the information thus gained, together with a daily bacteriological examination of the raw water and filtrate would establish the fact that the typhoid fever was largely dependent upon water borne organisms; that if these could be entirely eliminated typhoid would be practically obliterated.

During the first year of the complete operation of the filters; that is from July 1, 1910, to June 30, 1911, there was a typhoid fever epidemic beginning July 10, 1911, and continuing until September 25, 1911. During this period the filtrate was of excellent quality, containing an average bacterial content of 37 per c.c. and never exceeding 65 per c.c.

After November 1, and up to March 1, 1912, the quality of the filtrate was not nearly as good as it had been earlier in the season, and yet there appeared to be no typhoid fever cases except a few isolated ones, and the health of the community was unusually good, although the bacterial count in the filtrate reached as high as 3500 per c.c.

By a close study of the chart presented, it can, I think, be clearly seen that there is little or no relation between the water furnished and the typhoid fever occurring in Wilmington during the period from July 1, 1910, to July 1, 1911, and that we must look for other sources of infection, which was doubtless the house-fly.

The results of the operation of the filters for the year ending June 30, 1912, tells an entirely different story, as may clearly be seen by referring to the second chart here presented.

During January and February of 1912, considerable trouble was experienced with the proper operation of the filters through the formation of ice resulting in their becoming air bound. The bacterial count of the filtrate during this period averaging about 2500 per c.c., and running as high as 10,000 per c.c.

About the middle of January a virulent typhoid fever epidemic broke out in Coatesville resulting in nearly 260 cases. At this time the quality of the Wilmington effluent was unusually poor, and the Chief Engineer,

Mr. John A. Kienle, had all the reservoirs immediately disinfected with hypo-chlorite of lime of sufficient quantity to give one part of available chlorine to one million parts of water. On February 13, the hypo was injected into the filters, and it will be seen by the chart that the bacterial count in the filtrate immediately dropped from 1,000 per c.c. to 8 per c.c. Introducing the hypo in the influent to the filters destroyed the schmutz-decks upon the beds and thus largely destroyed their biological action, the count rising from 8 per c.c. to 2,500 per c.c.

On February 26 apparatus had been completed to introduce the hypo into the clear water reservoir, after which the bacterial count dropped to an average of 55 per c.c., and remained fairly constant until April 10, when the hypo was discontinued.

This chart demonstrates three significant facts. One is that within three to four weeks after the typhoid fever appeared in Coatsville, 30 miles above Wilmington's water intake, the fever appeared at Wilmington to an alarming extent; that the introduction of hypo-chlorite of lime in the filtered water exterminated the typhoid germs in the raw water and broke the threatened epidemic, and that during the first part of the fiscal year, from July 23, to the middle of November, when the quality of the filtrate was unusually good, there was considerable typhoid fever in the city. This latter period, it should be remembered, covered the fly season in this climate.

One point which the speaker wishes to bring out, and which he thinks is strongly shown by these two charts, is that while it is here proven beyond any reasonable doubt, that the furnishing of pure water is necessary to exterminate typhoid fever, it is not, by any means, the only act necessary to be done, and that in all probability the common house-fly plays quite an important part in the spread of this dread disease.

In fact flies are doubtless the greatest source of infection through their comtact with milk, butter and other food stuff. The fact that the element of time is practically eliminated in the fly makes the source all the more probable.

The percentage of typhoid fever attributed to drinking water has doubtless been over estimated. Fly typhoid occurs during the late weeks of the summer, whereas water-borne typhoid appears during the winter.

There is, of course, a certain amount of typhoid fever present throughout the year which might be termed as residual or due to infection.

A brief description of the charts submitted may be of interest as the writer believes they graphically describe the workings of a filter better than any others which have come under his notice. They were designed and prepared by Mr. Edgar A. Hoopes, assistant chief engineer of the Wilmington Water Department, who is a technical man of unusual ability. The writer will describe them in Mr. Hoopes' own language.

"The values plotted are the 48 hour counts of the raw and filtered water on ordinary standard nutrient gelatine. The results obtained include both saprophytic and pathogenic organisms developing at 20° c. The count on gelatine rather than the count at a higher temperature on Bile Agar or Lactose Litmus Agar was selected for the reason that gelatine is almost universally employed as a laboratory standard. In sowing the raw water $\frac{1}{10}$ of 1 c.c. is transferred from the original sample by means of a sterilized pipette and $\frac{1}{2}$ and 1 c. c. of the filtered water are plated in a similar manner.

"It is obvious that a scale for plotting values of such a fluctuating nature must permit of an exceedingly wide range in a comparatively small area. The circle being the most economical geometrical figure was therefore adopted and the limits of range determined. It was found by inspection that the number of bacteria per c. c. in the raw water rarely exceeded 200,000 while in the filtered water the number was rarely less than 10 per c. c. Concentric circles were then drawn with radii whose lengths in inches were equal to the numbers representing the natural logarithms of 200,000 and 10 respectively. Intermediate values between these limits are obtained in the same way. The circumference of the circle representing the limiting value of the scale was divided into 365 parts representing days which was in turn collected into weeks and months. It was not deemed advisable to show each day by a full line owing to the great number required and the subsequent confusion of the scale. For this reason the days are indicated by short lines and the weeks or Sundays by the full lines running to the center.

"The number of bacteria per c. c. are plotted daily with the exception of certain Sundays on which no plates were made. The typhoid scale is derived by dividing the distance between the center of the scale and the circle representing 10 bacteria, into five equal parts—each part or circle being equivalent to two typhoid fever cases. This subdivision was necessitated by the fact that zero can not be represented on a natural logarithmic scale, its value being infinity. As there were periods when the city was free from typhoid it was necessary to have some method of representing zero and this value is attributed by the subdivision employed, to the center of the chart.

"The typhoid fever cases are plotted by weeks since the area available at the center of the circle is too small to permit of daily plottings. As a last remark the writer would explain that natural logarithms were selected instead of the Briggs or common logarithms for the reason that they permit of a more convenient sized scale by direct plotting."

MUNICIPAL CONTROL OF TYPHOID FEVER.

CHARLES R. GRANDY, M. D., AND C. J. ANDREWS, M. D.,
Norfolk, Va.

The State of Virginia has in the last few years been waging an apparently successful war against typhoid fever under the guidance of the State Health Department, whose educational efforts have been especially commendable. Some of our cities also have succeeded in reducing their typhoid mortality, till they compare favorably with other cities of the country. Thus there have been only twelve deaths from typhoid fever in Norfolk during the year ending September 30, 1912, or a rate of less than 15 per 100,000. Still I feel that our educational efforts with their accompanying promises, which are absolutely necessary to impress the public, are likely to be found a little too roseate, and that there will still be left a Residual Typhoid, just as it was found that, when, working on the old Water Borne Theory, the water supplies had been purified, there were still cases of typhoid, though not so many.

We feel that in the cities at least we have gotten nearly as good results as we are going to get from our present methods, for we have long been preaching that typhoid was a preventable disease and one that was "a disgrace to our civilization," and our health departments have been expending more time and energy on its prevention than on any other disease. But typhoid is still with us, though we have purified and protected our water supplies, then controlled our dairies, and finally tried to reduce the number of flies and thus prevent fly infection. All these measures have had their effect and have reduced the number of our typhoid cases. But the number still remains far too large. There must be some other source of infection. This source is usually attributed to contact either with active cases or with carriers, which not only spread the disease by direct contact, but are the sources of infection for the water, milk, food and flies, for we all must recognize that these are not the real sources of the typhoid bacilli, but merely the means of transmitting them from the infected to the well.

The urine and fæces of active cases are now pretty generally disinfected, though this disinfection is not always as efficient as it ought to be, but the typhoid bacilli persist in the urine and fæces of convalescents for variable periods. Thus it is said that about 10 per cent. of convalescents, when discharged from treatment, still have active bacilli in their discharges, though the specimens sent to the Norfolk Health Department Laboratory have not shown near such a large percentage.

Now the Report of the United States Public Health Service in 1908

on the Origin and Prevalence of Typhoid Fever in the District of Columbia concludes as follows: "The results of three years of study show that the disinfection of excreta of patients is frequently inefficient or neglected, and that there is need of legal control of typhoid fever patients and typhoid bacillus carriers. We are convinced that a vigorous campaign against typhoid fever as a CONTAGIOUS DISEASE and the adoption of measures, which would prevent the spread of the infection in milk, would eliminate the greater part of typhoid fever from the District of Columbia." The conditions here are much the same as in Washington. Our typhoid is as a rule a summer typhoid, there being months each year in the winter and spring when there are no cases reported. Again it is seldom that cases in Norfolk can be traced to the water supply. So we have to look for our source of infection to contact, food (usually milk) and flies, but back of all these is the typhoid bacillus carrier, either an active case, a convalescent, or one in which the bacilli persist for years.

While not arguing that we should decrease our efforts at destroying the means of transmitting the disease from the typhoid bacillus carriers to the well, our lack of success in the past has shown that we must "carry the war into Africa" and control the real sources of infection. To do this it will be necessary for our health department to treat typhoid fever as a *contagious disease*, as was suggested in the Public Health Report just quoted. Now there are two general methods of preventing contagious diseases; in one we confer an active immunity on the people and make the destruction of the morbid material secondary; in the other we put our reliance on keeping the people away from infection, or better still the infection away from the people. By using anti-typhoid vaccination the Army and Navy have gotten brilliant results, such results as were impossible with the ordinary preventive measures, and we have all undoubtedly wished that we might be able to get similar results in our cities, but we have been so far staggered by the apparently insuperable difficulty of giving three successive injections of vaccine to an unwilling body of citizens. It is difficult enough to vaccinate ignorant negroes against small-pox, and repeated outbreaks of this disease in our Southern cities show that our methods here are not thorough. One can well imagine how difficult it would be to give all of our negroes the necessary three anti-typhoid vaccinations, for, if one bad reaction were gotten, it would be next to impossible to catch the patient or his friends for a second injection. Still vaccination offers the best method of promptly checking a localized epidemic, as was shown by the way a small epidemic at the local Naval Training Station in the summer of 1911 was promptly stopped by vaccinating everyone in camp. But outside of the Services this can only be considered as an emergency method, or one which will be voluntarily used by a small, but increasing part of the population. There is still

another objection to the use of anti-typhoid vaccination as a municipal measure, and that is that it, as now used, must be repeated every three years. The new method of Metchnikoff and Besredka, of using sensitized living bacteria, will probably extend the period of immunity as well as relieve the patient of febrile reaction and take only two injections. This improvement offers much for municipal hygiene, but it is still in the experimental stage, though it has been reported as successfully used on 750 people in England. Until we can get one vaccination which will protect for a number of years, we feel that the cities will have to rely on other means to eliminate their residual typhoid fever.

We have left the methods of isolation, generally used in controlling contagious disease. In this way we might handle typhoid in somewhat the same way we have been handling diphtheria. To be more explicit we would placard the room (not the house) in which there was a case of typhoid fever, and not allow the case to be discharged till permission was granted by the health department after an examination of the urine and fæces. If either of these showed the presence of typhoid bacilli, the patient might be kept in quarantine a week or so longer and a thorough course urotropine instituted. This would clear up a large number of cases, for it has proved efficient during convalescence, though not so in an old confirmed carrier. Cases still showing typhoid bacilli might be discharged with the warning, that their urine and fæces were still dangerous, that they must still disinfect them, that they must not carry on an occupation, which might infect the food supply of other people, and that at the end of a month they must again have their urine fæces examined by the health department. If they were still infected, an autogenous vaccine might be made and administered. These means would probably eliminate almost all the chronic carriers, and would keep those that were left under the supervision of the health authorities. Of course there might be some other chronic carriers, who either were never reported as having had typhoid fever, or who had the disease so mildly as to practically not produce symptoms. While such cases are beyond the control of the health authorities and cannot possibly be estimated, still their number should likewise be reduced by lessened sources of contact, which would result from the aforementioned plan.

Besides the protection furnished the community from carriers, this method would give the health authorities an efficient supervision of the ill cases and make the families disinfect the urine and fæces properly. We would also be able to see whether the patient were really getting proper care, and in case proper attention could not be given, the city should move the patient to a hospital and see that the community was protected from typhoid just as a city now sees that its citizens are protected from other contagious diseases.

The placard would also furnish a most efficient way to educate the Public, both as to how to care for typhoid and as to its dangers. Thus the placard on the door might read "This room is occupied by a case of TYPHOID FEVER. As the germs of the disease are found in the discharges of the patient, it is dangerous to use the same tableware and linen, unless thoroughly disinfected. It is also dangerous for a person, caring for a typhoid patient to prepare food for others, nor should they eat themselves without first carefully cleansing and disinfecting their hands. Patient is not to leave the room till permitted to do so by the Health Department after an examination of the urine and fæces." Printed directions should also be furnished, giving instructions as to how to care for the case and how to prevent the spread of the disease.

The most obvious objection to this plan would be that an ordinary city laboratory would not be able to make the necessary examinations. To answer this one of us, Doctor Andrews, has been making routine examinations of the stools of all convalescent typhoid cases before they were discharged from treatment. By using the method adopted by the United States Public Health Laboratory, as reported by Lumsden and Stimson, these examinations were found perfectly feasible without increasing the force ordinarily employed in the Norfolk Health Department Laboratory. Consequently we see no reason why any city should not adopt this plan of controlling typhoid fever, and feel further that it furnished the most hopeful way of dealing with a disease, which we all must recognize as far too prevalent throughout the United States.

INSTITUTIONAL VACCINATION AGAINST TYPHOID FEVER.

JOHN N. FORCE, M. D.

Assistant Professor of Epidemiology, University of California.

Read by title before the General Sessions, American Public Health Association, Washington, D. C., September, 1912.

For the last seven years, the University of California has been conducting a system of illness insurance for its students. The benefits of this system are not paid in money, but consist in:

A. Preventive medical measures (compulsory).
   1. Medical entrance examination.
   2. Vaccination against smallpox.
   3. Lectures in hygiene.

B. Preventive medical measures (optional).
   1. Vaccination against typhoid fever.
   2. Isolation hospital for communicable diseases.

C. Curative medical measures (optional).
   1. Dispensary treatment.
   2. Hospital treatment.
   3. Lectures in First Aid (men).
   4. Lectures in Home Care of the Sick (women).

Medical entrance examinations and vaccination against small pox are compulsory measures intended to protect the student community against the importation of disease; dispensary treatment and the lectures are intended to protect the individual while in the community, and to increase his self-protective efficiency in after life. Protection of the individual who leaves the community is needed especially by that 20 per cent. of the student population of 3,750 who are enrolled in the engineering colleges. The engineering students spend their summers in camps, mines, irrigation projects or forests gaining the experience necessary for graduation. Under these conditions of service they are especially exposed to typhoid fever, and the opening of every college year brings a few of these summer campers to the infirmary to drag out the weary and expensive course of this disease.

At the opening of the last college year the Department of Hygiene considered the advisableness of offering the vaccination against typhoid fever to the student body, as a further means of self-protection for the individual, while absent from the community. A study of the reactions of enlisted men in the United States Army, following the administration of the army vaccine, showed that the standards used in classifying these reactions would be somewhat low if applied to college students, who

resent bitterly anything which comes between them and the worship of that peculiar and exacting divinity known as "College Activities."

Any process which would keep the student "out of things" for twenty-

UNIVERSITY OF CALIFORNIA INFIRMARY.

RECORD OF ANTI-TYPHOID VACCINATION.

Name..... *Sex*..... *Coll*..... *Class*.....

No. of Dose	I	II	III	No. of Dose	I	II	III
Date				*General reaction*			
Hour				Chill			
Size of dose				Fever			
Beginning of reaction				Pain			
Duration of reaction				Nausea			
Local reaction				*Remarks*			
Area of induration							
Area of redness							
Axillary adenitis							
Tenderness							
Ecchymosis							

Fig. 1 Form of individual record card.

UNIVERSITY OF CALIFORNIA INFIRMARY.

NOTICE TO PERSONS RECEIVING ANTI-TYPHOID VACCINATION.

In from three to five hours you will notice at the site of the inoculation, a small hard lump about the size and shape of half a walnut shell. This will be in the center of a somewhat larger area of redness. The red area may turn dark like a bruise. At the same time you may have a slight rise in temperature and perhaps some pain in the back and neck. You are requested to:

1. Measure and note the size of the hard lump..... cm. ..... in.
2. Measure and note the size of the red area..... cm. ..... in.
3. Record your temperature every two hours for twelve hours following the inoculation.

If you are not familiar with the use of the clinical thermometer, do not shake it between observations, but note when the mercury reaches the highest point. This will be read when you return the thermometer. Always bring the thermometer with you.

Return on the two dates stamped on this card.

DATES OF INOCULATION.

Fig. 2 Card of directions with return dates.

four to forty-eight hours would be doomed to failure. However it was manifestly a departmental obligation to offer the privilege of vaccination against typhoid fever to the student body. The Department of Pathology

was invited to coöperate by manufacturing the vaccine, and Dr. F. P. Gay, Professor of Pathology, suggested that the anticipated unpleasant reactions due to the vaccine when manufactured after the method of Wright, might be avoided if the vaccine were prepared according to the principles advocated by Besredka in 1902.

Accordingly the vaccine was prepared under the direction of Doctor Gay, by Dr. Edith Claypole to whom I am indebted for the following description:

> The "Army and Navy" strain, (long cultivated on laboratory media) of B. typhosus was used. A 24 hour bouillon culture was planted on ten large flat sided (Blake) bottles of agar, incubated at 37.5 degrees C. for 36 hours. The growth then washed off in sterile salt solution, 100 c. c. being the total volume. One c. c. of a strongly agglutinating serum (1—20,000) was added to this emulsion and it was allowed to stand one night in the ice box. Equal parts of absolute alcohol were then added to the suspension, the organisms quickly flocculated out completely and after centrifugalization in a high speed centrifuge, the supernatant fluid was poured off and the residue transferred to a sterile evaporating dish and dried in a partial vacuum over night. The residue was then scraped off carefully to avoid any contamination, put into a grinder and ground for one hour. This fine bacterial powder kept sterile can be used at any time, making up a suspension of $\frac{1}{16}$ mg. to 1 c. c. carbolated .85 per cent. salt solution.

Tests made on rabbits showed that the protective power of this sensitized vaccine was in no wise less than that of the ordinary unsensitized vaccine. Test vaccinations were made by Doctor Claypole of some ten or twelve persons connected with the Department of Pathology, and their reactions proving mild, the vaccine was turned over to the Department of Hygiene. Notices were at once posted to the effect that appointments might be made for vaccination against typhoid fever.

Though advertised only one month before the final examinations of the college year, the announcement brought 261 persons to take the first inoculation. Of these 246 finished the series of three doses. Each person at the time of the first inoculation was given a card of directions stamped with the dates for subsequent doses, and a clinical thermometer if familiar with its use. In this way temperature observations were secured from 161 persons. All observations were recorded on individual filing cards.

The technique of administering the vaccine consisted in painting a spot 1 cm. in diameter at the deltoid muscle insertion of the left arm and injecting 1 cc. of the suspension equivalent to 500 millions of bacteria. Two subsequent doses of the same amount were given at three day intervals using alternate arms. The syringe used had a clear glass barrel with a blue glass plunger. A sterile needle was used for each injection. After using, the needle was sterilized in oil which insured a longer life to it than was possible by boiling in water. The students made appointments in groups of twenty-five per hour which gave ample time for making the records. Six needles were employed which gave time for cooling.

SUMMARY OF REACTIONS AFTER ADMINISTRATION OF SENSITIZED ANTI-TYPHOID VACCINE.

Persons in series: Men—233; Women—28.

	1st inoculation.		2nd inoculation.		3rd inoculation.	
	Men.	Women.	Men.	Women.	Men.	Women.
Persons reporting	227	27	219	27	154	17
Beginning of reaction:						
1–2 hours	91	8	100	8	60	4
3–4 hours	89	9	92	7	57	5
5–6 hours	33	3	17	4	14	2
Duration of reaction:						
Under 12 hours	83	1	90	1	59	1
24 hours	85	4	77	10	48	3
36 hours	9	5	14	4	6	5
48 hours	32	10	28	6	16	9
Local Symptoms:						
1. Induration:						
Present	58	15	73	15	44	9
5 cm.	5	..	6	4	2	4
10 cm.	..	..	2	1	1	..
2. Redness:						
Present	86	14	96	13	62	9
5 cm.	35	4	33	5	13	3
10 cm.	4	..	6	1	1	..
15 cm.	..	..	1	..	..	..
3. Axillary Adenitis	18	3	37	3	16	..
4. Tenderness	219	21	212	22	147	13
5. Ecchymosis	16	4	15	8	10	6
General Symptoms:						
1. Chill	2	1	4	3	..	..
2. Temperature:						
Below 37° C.	41	4	44	4	34	3
37° C.	46	3	53	2	55	5
37° C. to 38° C.	54	11	50	8	26	3
over 38° C.	2	..	3	..	1	..
3. Fall in temperature during first 4 hours	63	3	41	1	19	1
4. Pain:						
Head	26	6	40	3	20	2
Arm	26	4	37	6	18	4
Shoulder	9	2	12	1	3	..
Neck	15	5	20	3	12	2
Back	7	2	12	4	8	1
5. Nausea	2	2	3	1	..	..
6. Faintness	3	..	1	..	..	..

The accompanying table summarizes the reactions of this student series. In almost every instance where the temperature is recorded as less than one degree elevation above normal, this rise amounted to barely one half of a degree centigrade. In general the reactions were more pronounced among the women. It will be noted that a number of persons showed a fall in temperature during the first four hours after inoculation. This usually was followed by a return to normal or over in the first twelve hours, but in some fifty cases the temperature had not returned to normal at the end of the twelve hours of observation.

In one instance a simple broncho-pneumonia developed 24 hours after the first inoculation in a patient with a history of arrested tuberculosis. The typhoid antigen probably had the effect of a tuberculin. One of the women complained of severe backache and three loose stools following the second inoculation. The second dose in general shows more marked symptoms than the others.

Two students reported faintness not amounting to actual unconsciousness, and one spent two days in the Infirmary with headache and nausea following three fainting attacks during the twelve hours following his first inoculation. This man, however, had no marked local symptoms or rise in temperature.

Besredka now advocates the use of living cultures, but as long as American statistics show satisfactory results with killed bacilli their use will no doubt be the most general in this country for some years to come. The sole objection to their use is found in the severity of the reactions produced by them, and if these reactions can be lessened without impairing the immunizing effect the vaccination against typhoid fever will become more popular.

This series of high-tension young adults was most potential for severe reactions, yet the results abundantly justify the use of the sensitized dead cultures, as a means of avoiding them.

THE SOLUBILITY OF WHITE LEAD IN HUMAN GASTRIC JUICE, AND ITS BEARING ON THE HYGIENE OF THE LEAD INDUSTRIES.

A. J. Carlson and A. Woelfel,

From the Hull Physiological Laboratory of the University of Chicago.

The following investigation was undertaken at the request of Dr. Alice Hamilton, Special Investigator of Lead Poisoning for the Federal Bureau of Labor, because of the availability in our laboratory of normal human gastric juice.

The relative importance of the skin, the lungs, and the digestive tract as avenues of the lead absorption in workers in the lead industries seem to be determined only to this extent that the skin is the least important. While lead may be absorbed through the intact skin under special conditions of prolonged application of lead compounds to the skin, it may be questioned whether under ordinary working conditions absorption through the skin contributes to industrial plumbism. There remain, then, to consider the lungs and the digestive tract. Meillère* seems to show that while poisoning may occur by absorption of lead from the lungs, this is not a channel of absorption of practical importance in the industries. Goadby,† on the other hand, concludes that absorption from the lungs is the prime factor in most forms of plumbism. Goadby subjected cats to breathing air charged with various kinds of lead dusts. Lead poisoning resulted in every case. The only precaution taken against lead dust reaching the stomach was brushing as much of the lead dust as possible from the animals' fur at the end of every inhalation period. It is therefore certain that some of the lead dust was swallowed with the saliva and the mucus from the respiratory passages. But Goadby's experiments seem to show that when the same lead dusts are given by mouth a much greater quantity is required than in the case of inhalation, the ratio estimated being 100 : 1. Thus, one cat (No. 12) was fed 0.8 gr. dry white lead a day for eighteen months without producing any other symptoms than some loss of weight. Other cats fed similar quantities of white lead daily developed symptoms only when alcohol was administered at the same time. This extraordinary tolerance of cats to dry white lead *per os* cannot be accepted as normal, in view of the results of our own feeding tests with white lead to dogs and cats. Legge & Goadby (*loc. cit.*) point

*Meillère: *Le Saturnisme*, Paris, 1903.

†Goadby: *Jour. of Hygiene*, 1909, IX, p. 122; Goadby & Goodbody, *Lancet*, 1909, II, p. 988; Legge & Goadby, "Lead Poisoning and Lead Absorption," London, 1912.

out that on the whole, cases of lead poisoning are most frequent in the industries in which lead dusts are not adequately controlled. This is unquestionably true, but it does not follow that this lead dust enters the body mainly, or at all, by the lungs.

The lead dust, like any other dust, settles all over the person exposed to it. It permeates his clothes, and settles on the skin, the hair, in the mouth, and in the respiratory passages. In the mouth the dust acts as a stimulus to salivation, and in an animal like the cat, which does not expectorate, this increases the frequency of swallowing. Some men are in the habit of swallowing the mucus from the trachea—and even that from the nasal passages. It is, therefore, obvious that the chances for swallowing lead increases greatly with the presence of lead dust. At the same time some of the lead dust particles must reach the alveoli of the lungs, and may pass into the body without solution, like particles of carbon. But most of the lead dust that penetrates down to the bronchioles and alveoli must, unless dissolved, become entangled in the film of mucus and eventually passed out via the trachea. It is well known that after breathing coal dust or dense smoke for an hour a man may continue to discharge carbon-stained mucus from the trachea for more than twenty-four hours. It is obvious that only an insignificant fraction of the insoluble dust in the respired air is taken up by the alveolar cells, or by the leucocytes and retained by the lymph glands. The carbon particles in the lungs and lymph glands of an old coal miner or a stoker probably amounts to less than a gram, while the quantity of carbon passed in and out of the lungs via the trachea must have reached many kilos.

Lead poisoning occurs in industries where no lead dusts are produced. And since lead dusts in the respired air increases the changes of lead dust entering the stomach, it is clear that the digestive tract is in some cases the sole, and probably in all cases, the most important avenue of absorption of the lead in industrial lead poisoning.

There is no evidence that the lead salts are absorbed from the digestive tract or act locally on the mucosa, except when in solution. The strongest solvent in the digestive tract for the lead salts is the hydrochloric acid of the gastric juice, and of less importance the lactic acid, and other organic acids produced in the course of hydrolysis of proteins and of fats and of bacterial activity. In view of the humane and economic importance of lead poisoning in the industries, the literature on the action of the gastric juice on the different lead salts appears fragmentary. It was even assumed until recently that lead sulphate is practically insoluble in the stomach and intestines. This view led to the practice of giving sulphuric acid lemonade to lead workers as a prophylactic measure. Blum,* Goadby,†

*Blum: *Wien. Med. Woch.*, 1904, LIV, p. 538; *Deut. Med. Woch.*, 1912, XXXVIII, p. 645.
†Goadby: *Jour. of Hygiene*, 1909, IX, p. 122.

Shicksal* and Beck† have studied the solubility of various lead salts in dilute hydrochloric acid, in various artificial gastric digest mixtures, and in gastric juice. All agree that the lead sulphate is soluble in these media. One of Goadby's two experiments with human gastric juice (10 cc. gastric juice + 0.1 gr. of the lead salts, at 37° C. for one hour) appears to show that the lead sulphate is more soluble than is lead carbonate (white lead) or lead oxide (litharge). The second experiment showed practically the same solubility for the three salts. The work of Blum and Schicksal indicates that the presence of peptone in gastric digest mixtures increases slightly the solubility of the lead salts.

Material.

Samples of paint dust of "Basic Lead Carbonate" and "Basic Lead Sulphate" respectively, were sent us by Mr. A. M. Johnson, chief chemist of the Pullman Company. Mr. Johnson states that the samples submitted were typical of the paint dust produced in the Pullman shops by sand papering painted metal.‡ The dust samples contained per gram lead corresponding to the following quantities of lead sulphate:

Basic lead carbonate paint dust	1.04 1.04 1.06	1.05 gr.
Basic lead sulphate paint dust	0.86 0.87 0.82	0.85 gr.

Samples of sublimed white lead (basic lead sulphate) and of lead carbonate ("Old Dutch Process") were sent us by the Pilcher Lead Company, Joplin, Mo. These samples were not mixed with oil. On analysis they were found to yield per gram the following quantities of lead sulphate:

Lead carbonate	1.12 1.12	1.12 gr.
Basic lead sulphate	0.98 0.96	0.97 gr.

The Gastric Juice. Normal human gastric juice was obtained from a man twenty-seven years old, with complete constriction of the œsophagus and a gastric fistula of sixteen years' standing.§ The juice was secreted while the man was chewing palatable food when hungry. Hence it was normal "appetite" or "psychic" juice, not mixed with saliva. The total acidity varied from 0.40 per cent. to 0.52 per cent.

*Schicksal: *Die Bekämpfung der Bleigefahr in der Industrie*, 1908.

†Beck: *Arb. a. d. Kais. Gesundheitsamt*, 1910, XXXIV, p. 446.

‡We are informed that the Pullman Company has recently discontinued the use of the Lead Carbonate paints in favor of the lead sulphate paints.

§Carlson: *Am. Jour. of Physiology*, 1912, XXXI, p. 151.

I. The Relative Solubility of Lead Carbonate and Lead Sulphate (Paint Dusts and Pure Salts) in Gastric Juice.

The results are given in Tables I–IV. The lead carbonate proved in every case to be much more soluble than the lead sulphate. The lead carbonate paint dust is nearly as soluble as the pure white lead, while the lead sulphate paint dust is less soluble than the pure basic lead sulphate. We are at a loss to account for Goadby's results showing greater solubility of the lead sulphate in gastric juice, except on faulty methods. A greater

TABLE I.

RELATIVE SOLUBILITY OF BASIC LEAD SULPHATE AND BASIC LEAD CARBONATE PAINT DUST IN HUMAN GASTRIC JUICE.

25 cc. gastric juice + 25 cc. water + 0.5 gr. Basic Lead Sulphate paint dust, at 38° C. for 10 hours.		25 cc. gastric juice + 25 cc. water + 0.5 gr. Basic Lead Carbonate paint dust, at 38° C. for 10 hours.	
Exper. No.	Lead dissolved.	Exper. No.	Lead dissolved.
1	(1) 0.0396 gr. (2) 0.0276 gr.	1	(1) 0.1964 gr. (2) 0.2684 gr.
2	(1) 0.0582 gr. (2) 0.0680 gr.	2	(1) 0.2364 gr. (2) 0.2284 gr.
3	(1) 0.0436 gr. (2) 0.0400 gr.	3	(1) 0.2264 gr. (2) 0.2262 gr.
4	(1) 0.0420 gr. (2) 0.0594 gr.	4	....
Average—0.0485 gr. = 5.7%.		Average—0.2303 gr. = 4.6%.	

solubility of lead sulphate than of lead carbonate in gastric juice seems a chemical impossibility. We note that Goadby records only two tests and the lead was determined after *centrifuging the digestive mixture* instead of in a clear filtrate. It seems probable that varying quantities of the lead salts were present in suspension in addition to that in actual solution.

Peptone in concentrations of .1 per cent. and of 1 per cent. does not have a marked influence on the solubility of the lead salts, but the influence of peptone so far as it is in evidence is in the direction of increasing the quantity of lead dissolved. The formation of lead-peptone compounds might lead to the setting free of the chlorine ions in the lead chloride, and thus to the formation of more lead chloride from the carbonate and

the sulphate. Our figures show that this is not an important factor in lead poisoning from the digestive tract.

The solubility of the lead salts in pure gastric juice is practically the same as that in similar quantities of .5 per cent. hydrochloric acid. It is therefore clear that the hydrochloric acid of the gastric juice is the all-important solvent. Pepsin, rennin, and other organic constituents may combine with the lead salts when in solution, but if this is the case, the reaction does not appreciably affect the quantity of lead salts held in solution.

TABLE II.

THE INFLUENCE OF PEPTONE ON THE SOLUBILITY OF THE BASIC LEAD SULPHATE AND THE BASIC LEAD CARBONATE PAINT DUST IN HUMAN GASTRIC JUICE.

25 cc. gastric juice + 25 cc. water + 0.1 gr. peptone + 0.5 gr. Basic Lead Sulphate paint dust, at 38° C. for 10 hours.		25 cc. gastric juice + 25 cc. water + 0.1 gr. peptone + 0.5 gr. Basic Lead Carbonate paint dust, at 38° C. for 10 hours.	
Exper. No.	Lead dissolved.	Exper. No.	Lead dissolved.
1	(1) 0.0802 gr. (2) 0.0784 gr.	1	(1) 0.2600 gr. (2) 0.2050 gr.
2	(1) 0.0484 gr. (2) 0.0660 gr.	2	(1) 0.2222 gr. (2) 0.2464 gr.
3	(1) 0.0422 gr. (2) 0.0636 gr.	3	....
Average—0.0628 gr. = 7.3%.		Average—0.2334 gr. = 46%.	

We were especially interested in the action of milk on the solubility of the lead salts in human gastric juice and weak solutions of hydrochloric acid, in view of the fact that in some places lead workers are required to drink milk before starting work. And practical experience seems to show that milk or other food in the stomach minimizes the danger of lead poisoning from the digestive tract. When milk and gastric juice is mixed in the proportion of one to one, lead salts added, and the mixture incubated at body temperature for ten hours, not enough lead goes into solution to get a qualitative lead test. In two cases a positive qualitative test was obtained when the lead carbonate paint dust was used. The same results are obtained in mixtures of milk and 0.5 per cent. hydrochloric acid. But when the ratio of the gastric juice or hydrochloric acid to the milk is increased the lead salts are dissolved in proportion to

the increase in the quantity of gastric juice or hydrochloric acid (Table IV).

The above action of milk is probably due to the fixation of the hydrochloric acid by the milk protein and the neutralization of the hydrochloric acid by the carbonate of the milk. Hence, when an excess of milk is added to the gastric juice there will be no hydrochloric acid to effect

TABLE III.

THE RELATIVE SOLUBILITY OF LEAD CARBONATE ("OLD DUTCH PROCESS") AND BASIC LEAD SULPHATE ("SUBLIMED WHITE LEAD") IN HUMAN GASTRIC JUICE.

Lead Sulphate.			Lead Carbonate.		
Exper. No.	Digestive Mixture.	Lead dissolved.	Exper. No.	Digestive Mixture.	Lead dissolved.
1	25 cc. gastric juice 25 cc. water. 0.5 lead sulphate at 38° C. for 10 hrs.	(1) 0.1260 gr. (2) 0.1210 gr.	1	25 cc. gastric juice 25 cc. water. 0.5 gr. lead carbonate at 38° C. for 10 hours.	(1) 0.2940 gr. (2) 0.3044 gr.
2	25 cc. gastric juice. 25 cc. water. 0.5 gr. lead sulphate 0.1 peptone (1). 0.5 gr. peptone (2) at 38° C. for 10 hours.	(1) 0.1376 gr. (2) 0.1284 gr.	2	25 cc. gastric juice. 25 cc. water. 0.5 gr. lead carbonate. 0.1 gr. peptone (1). 0.5 gr. peptone (2) at 38° C. for 10 hours.	(1) 0.3302 gr. (2) 0.3100 gr.
3	50 cc. gastric juice. 0.5 gr. lead sulphate at 38° C. for 10 hrs.	(1) 0.1500 gr.	3	50 cc. gastric juice. 0.5 gr. lead carbonate at 38° C. for 10 hours.	0.3896 gr.
Average—(1) 0.1235 gr. = 25.0%. (2) 0.1330 gr. = 27.0%. (3) 0.1500 gr. = 30.0%.			Average—(1) 0.2990 gr. = 53.0%. (2) 0.3201 gr. = 57.0%. (3) 0.3896 gr. = 69.0%.		

solution of the lead salts, while in the presence of an excess of gastric juice some free hydrochloric acid remains to act on the lead. We are inclined to the view that the formation of insoluble lead albuminates is a factor of minor importance in the above action of milk.

These experiments *in vitro* do not reproduce some of the conditions that obtain in normal gastric digestion. The fixation of the hydrochloric acid by the proteins takes place in the stomach as well as in the test tube

TABLE IV.

THE INFLUENCE OF MILK ON THE SOLUBILITY OF LEAD SALTS IN HUMAN GASTRIC JUICE AND IN 0.5% HYDROCHLORIC ACID.

Lead Sulphate.			Lead Carbonate.		
Exper. No.	Digestive Mixture.	Lead Dissolved.	Exper. No.	Digestive Mixture.	Lead Dissolved.
1	25 cc. gastric juice. 25 cc. milk; 0.5 B. L. Sulphate paint dust at 38° C. for 10 hrs.	(1) None. (2) None.	1	25 cc. gastric juice. 25 cc. milk; 0.5 gr. B. L. Carb. paint dust at 38° C. for 10 hrs.	(1) Trace. (2) Trace.
2	25 cc. gastric juice. 25 cc. milk; 0.5 gr. B. L. Sulphate paint dust at 38° C. for 10 hours.	(1) None. (2) None.	2	25 cc. gastric juice. 25 cc. milk; 0.5 gr. B. L. Carb. paint dust at 38° C. for 10 hrs.	(1) None. (2) None.
3	25 cc. gastric juice. 25 cc. milk; 0.5 gr. B. L. Sulphate paint dust at 38° C. for 10 hours.	(1) None. (2) None.	3	25 cc. gastric juice. 25 cc. milk; 0.5 gr. lead carbonate at 38° C. for 10 hours.	(1) Trace. (2) Trace.
4	25 cc. 0.5% HCl. 0.5 gr. B. L. Sulph. paint dust at 38° C. for 10 hours.	(1) 0.0578 gr. (2) 0.0562 gr.	4	25 cc. 0.5% HCl. 0.5 gr. B. L. Carb. paint dust at 38° C. for 10 hours.	(1) 0.3284 gr. (2) 0.3344 gr.
5	25 cc. 0.5 HCl. 25 cc. milk; 0.5 gr. B. L. Sulph. paint dust at 38° C. for 10 hours.	(1) None. (2) None.	5	25 cc. 0.5 HCl. 25 cc. milk; 0.5 gr. B. L. Carb. paint dust at 38° C. for 10 hours.	(1) None. (2) None.
6	50 cc. 0.5 HCl. 25 cc. milk; 0.5 gr. B. L. Sulph. paint dust at 38° C. for 10 hours.	(1) 0.0126 gr. (2) 0.0132 gr.	6	50 cc. 0.5 HCl. 25 cc. milk; 0.5 gr. B. L. Carb. paint dust at 38° C. for 10 hours.	(1) 0.1320 gr. (2) 0.1218 gr.
7	100 cc. 0.5 HCl. 25 cc. milk; 0.5 gr. B. L. Sulph. paint dust at 38° C. for 10 hours.	(1) 0.059 gr. (2) 0.0580 gr.	7	100 cc. 0.5 HCl. 25 cc. milk; 0.5 gr. B. L. Carb. paint dust at 38° C. for 10 hours.	(1) 0.4010 gr. (2) 0.4340 gr.
8	100 cc. gastric juice. 25 cc. milk; 0.5 gr. Basic Lead Sulphate at 38° C. for 10 hrs.	0.1740 gr.	8	100 cc. gastric juice. 25 cc. milk; 0.5 gr. Lead Carb. at 38°C. 10 for hours.	0.4500 gr.

so that the presence of proteins retards the appearance of free hydrochloric acid in the contents of the stomach. But the work of Cannon and others renders it highly probable that relaxation of the pyloric sphincter and entrance of the gastric content into the duodenum is ordinarily preceded by the development of some free hydrochloric acid in the pyloric portion of the stomach. This hydrochloric acid will, of course, tend to dissolve any lead salts in the chyme until it is neutralized in the duodenum. Albuminous food stuffs can, therefore, diminish the solution of lead salts in the stomach only to the extent that they fix the hydrochloric acid in the gastric juice.

The taking of milk is a more efficient prophylactic measure than the taking of an equal amount of other forms of proteins, because there is less appetite secretion of gastric juice with milk, and the fat in the milk depresses and retards the action of gastric secretagogues.

II. The Action of Bile on the Lead Salts.

The ferments of the pancreatic juice and the intestinal juice have, of course, no action on the lead salts, except indirectly in case of lead albuminates and similar combinations, formed in the stomach by lead salts already in solution. The solution of lead salts in the intestines must therefore depend on the weak organic acids produced in the hydrolysis of the foods, or bacterial action, and on the alkalinity of the digestive juices poured into the intestine.

Normal pancreatic juice was not available to us, but a number of tests were made of the possible solution of the lead sulphate and the lead carbonate paint dust in dog and ox bile. When mixed in the following proportion, 25 cc. bile + 25 cc. water + 0.5 gr. of the lead salt, with or without peptone, at 38° C. for ten hours, not enough of lead went into solution to give a qualitative test for lead. This applies to both the carbonate and the sulphate paint dusts. The presence of peptone had no effect.

III. The Relative Toxicity of Basic Lead Sulphate and Basic Lead Carbonate (Paint Dusts and Pure Salts) when Fed to Dogs and Cats.

Since it is not possible in experiments *in vitro*, even when normal gastric juice is available, to reproduce some of the essential conditions of gastric digestion, the final solution of the question of the relative toxicity of the different lead salts must be sought by feeding experiments. Goadby fed various lead salts to cats. Five cats received from 0.5 gr. to 0.8 gr. dry white lead (lead carbonate) per day for periods varying from one to eighteen months. According to Goadby this quantity of lead carbonate per day

produced practically no symptoms unless alcohol was given at the same time. One must infer from Goadby's work that cats are unusually resistant to lead salts given by mouth. In an earlier work Leymann* showed, however, that even the slightly soluble lead sulphate produces toxic symptoms in eight or nine days when fed to cats in quantities of 0.2 gr. per day. Blum† concludes that the sulphate is less toxic than the other lead salts employed in the industries.

TABLE V.

Day.	Dog *A*, Weight 10 K.	Dog *B*, Weight 11 K.
1	2.0 gr. Basic Lead Sulphate paint dust in meat at 8 A. M. and 4 P. M.	2.0 gr. Basic Lead Carbonate paint dust in meat at 8 A. M. and 4 P. M.
2	Dog normal.	Vomiting, great thirst, polyuria, depression, some tremors, no appetite.
3	Dog normal.	Condition same as on 2d day.
4	Dog normal.	Eats a little, drinks and vomits frequently.
5	Dog normal.	Condition about same as on 4th day.
6	Dog normal.	Considerably improved, eats, does not vomit, but seems depressed.
7	Dog normal.	Dog seems fairly normal.
	Dog *C*, Weight 7 K.	Dog *D*, Weight 6.5 K.
	4.0 gr. Basic Lead Sulphate paint dust in meat at one feeding. Dog developed some constipation, but no other symptoms of lead poisoning.	4.0 gr. Basic Lead Carbonate paint dust in meat at one feeding. Dog ran practically the same course of acute lead poisoning as Dog *B*, with final complete recovery.

FEEDING EXPERIMENTS.—SERIES I.

Dogs of nearly the same size and age were selected, and 4.0 gr. of the lead sulphate and the lead carbonate paint dusts respectively were fed to the dogs in ground meat, either in one feeding or in two feedings, eight hours apart. The results are summarized in Table V.

The feces of dogs A and B (Table V) were collected for six days after giving the lead paint dust per mouth, and the quantity of lead determined, with the following result:

*Leymann: *Arch. f. Hygiene*, 1892, XVI, p. 316.
†Blum: *Deut. Med. Woch.*, 1912, XXXVIII, p. 645.

Dog B, fed 4 gr. basic lead carbonate, containing 4.16 gr. lead determined as sulphate. Lead recovered in the feces 2.61 gr. or 62 per cent.

Dog A, fed 4 gr. basic lead sulphate, containing 3.28 gr. lead, determined as sulphate. Lead recovered in feces = 3.10 gr. or 94 per cent.

The lead in the feces of Dog C and D was not determined.

Feeding Experiments.—Series II.

Eight dogs were selected for this test, and grouped in pairs of approximately the same body weight. One of the dogs of each pair was fed the sulphate paint dust in meat, the other one given the carbonate paint dust in meat. The quantity of the lead paint dusts given each dog was fixed to equal 0.1 gr. lead sulphate per kilo body weight. The dogs fed the sulphate paint dust thus received a greater quantity of the dust, as this dust contained a lower percentage of lead than the carbonate paint dust.

The results are summarized in Table VI. The table shows that the dogs receiving the lead carbonate paint dust developed severe symptoms of acute lead poisoning within 24–48 hours after the first feeding, while the dogs fed the sulphate paint dust showed very mild symptoms of lead intoxication only after three or four feedings, that is, after 72–96 hours. Feeding experiments as tests of relative toxicity break down, of course, as soon as vomiting or lack of appetite appears, as one cannot control the quantity of lead salts eaten or retained. For that reason the experiment was discontinued as soon as there appeared symptoms of intoxication in the dogs receiving the least toxic lead salt, that is, the sulphate.

Feeding Experiment.—Series III.

The results of the feeding tests with the sulphate and the carbonate of lead to dogs do not agree with those of Goadby on cats. It does not seem likely that cats have so much greater tolerance than dogs to lead salts *per os*. Legge and Goadby claim, indeed, that cats are especially susceptible to lead poisoning. Moreover, Leymann obtained symptoms in cats from feeding 0.2 gr. lead sulphate per day for eight to nine days. How are Leymann's results on cats and our results on dogs to be reconciled with Goadby failing to produce lead poisoning in cats on feeding the more toxic lead carbonate in daily doses up to 0.8 gr. for two to eighteen months? It is difficult to understand where any material source of error might be concealed in the relatively simple process of mixing lead salts with the food, and observing the animals.

Our own test series consisted of four healthy cats, which we may designate as A, B, C and D. The quantity of the lead salts mixed with the food each day was fixed to equal 0.1 gr. lead sulphate per kilo body weight of cat. The amount of ground meat, fish, or milk and bread with which

the lead salts were mixed was less than each cat would ordinarily eat per day, so as to insure all of the lead salts reaching the stomach.

TABLE VI.

THE EFFECTS OF DAILY FEEDINGS OF LEAD SULPHATE AND LEAD CARBONATE PAINT DUSTS IN QUANTITIES OF 0.1 GR. PER KILO BODY WEIGHT.

Day.	Basic Lead Sulphate Paint Dust.				Basic Lead Carbonate Paint Dust.			
	Dog *A* 6.8 K.	Dog *C* 12.5 K.	Dog *E* 10.2 K.	Dog *G* 12.3 K.	Dog *B* 7.0 K.	Dog *D* 13.4 K.	Dog *F* 10.3 K.	Dog *H* 14.2 K.
1	Normal.	Normal.	Normal.	Normal.	Normal.	Normal.	Normal.	Normal.
2	Normal.	Normal.	Normal.	Normal.	Severe diarrhœa; vomiting; eats a little.	Diarrhœa; feces bloody; great thirst; vomits; eats a little.	Slight diarrhœa, otherwise normal; eats good.	Seems normal.
3	Normal.	Normal.	Seems normal, but does not eat as much as usual.	Normal.	Diarrhœa; depression; vomiting; eats a little.	Diarrhœa; vomiting; does not eat.	Diarrhœa; vomiting; eats a little.	Depression; some tremors; vomiting; eats a little.
4	Some depression; eats less than normally.	Normal.	Some depression; eats less than normally.	Had vomited during night; eats eagerly.	Diarrhœa; does not eat; great thirst.	Conditon fair; does not eat.	Diarrhœa; vomiting; eats a little.	Diarrhœa; vomiting; does not eat.
5	Refuses food; otherwise in good condition. Weight 6.9 K.	Slight depression. Vomiting. Weight 11.9 K.	Slight depression. Weight 9.8 K.	Slight depression; eats less than normally. Weight 12.4 K.	Condition fair; eats a little. Weight 6.6 K.	Condition fair; eats a little. Weight 12.8 K.	Diarrhœa, vomiting; does not eat. Weight 9.9 K.	Diarrhœa; depression; eats a little. Weight 13.1 K.

Cat A.—Fed 0.3 gr. lead carbonate per day. The first three days the cat did not touch the food, although a new lot was prepared each morning.

On the fourth day the cat ate about four fifths of the food. No symptoms were observed, but the cat did not touch food for two days following. On the seventh to the eleventh day the cat ate about one fourth of the food each day. No obvious symptoms of lead poisoning.

Cat B.—Fed 0.37 gr. lead sulphate per day. Cat refused the food-lead mixture the first three days. The fourth day the cat ate all the food. On the sixth to the eighth day about one third of the food. On the ninth day all the food was consumed, but on the two following days less than half of it was taken. No lead intoxication in evidence.

Cat C.—Fed 0.31 basic lead carbonate paint dust per day. First day cat ate about three fourths of the food-lead mixture; second day cat ate about half of the mixture. On the morning of the third day the cat had vomited a considerable mass of partly digested meat. The cat seemed depressed during the third to the eighth days and refused all food. During the ninth to the eleventh days the cat ate about one fourth of the food each day. There were no further symptoms.

Cat D.—Fed 0.3 gr. basic lead sulphate paint dust per day. The cat did not touch the food-lead mixture during the first three days. On the remaining eight days of the feeding period the cat ate all the food on four days, and on the other days about one third of the food. No symptoms of lead poisoning appeared at any time.

This eleven day feeding period convinced us of one thing only, namely, that mixing the lead salts with the food is not a feasible method in the case of cats. Through taste or odor the addition of small quantities of lead salts to the ground meat, fish, or milk and bread renders the food mass so unpalatable that the cats will starve for days, rather than eat, and one cannot be certain of the cat eating even a small portion of the food on any day. In a test of the relative toxicity of the two salts it is, of course, essential that all of the salts given shall reach the stomach each day. The method of mixing the lead salts with the food was therefore abandoned. A second series of four cats were selected and 0.1 gr. of the lead salts per kilo body weight administered in gelatin capsules each morning before giving the customary food. The results are given in Table VII.

The cats varied in weight from 2.5 K. to 3.5 K. Hence 0.25 gr. constituted the smallest and 0.35 gr. the largest dose of lead salts given per day. Toxic symptoms were produced by all the salts, but the lead carbonate and the lead carbonate paint dust were distinctly more toxic than the basic lead sulphate and the lead sulphate paint dust. The toxic symptoms noted were vomiting, loss of appetite, constipation and depression. The feeding period was too short for the development of the chronic nervous symptoms.

It will thus be seen that cats and dogs show about the same susceptibility

to lead intoxication *per os*. Lead carbonate and lead sulphate when given daily in quantities up to 0.1 gr. per kilo body weight produce toxic symptoms within two to eight days.

TABLE VII.

CATS FED 0.1 GR. OF THE RESPECTIVE LEAD SALTS PER KILO BODY WEIGHT EVERY MORNING BEFORE BEING GIVEN THEIR USUAL FOOD.

Feeding day.	Cat I. Fed Lead Carbonate.	Cat II. Fed Lead Sulphate.	Cat III. Fed Lead Carbonate Paint Dust.	Cat IV. Fed Lead Sulphate Paint Dust.
1	Normal.	Normal.	Normal.	Normal.
2	Vomited.	Normal.	Normal.	Normal.
3	Did not eat.	Normal.	Vomited.	Normal.
4	Did not eat.	Vomited.	Normal.	Normal.
5	Eats a little; depressed.	Seems normal.	Vomited.	Normal.
6	Eats a little; depressed.	Seems normal.	Did not eat.	Normal.
7	Vomited.	Seems normal.	Did not eat.	Normal.
8	Did not eat.	Seems normal.	Eats a little.	Eats a little.
9	Did not eat.	Vomited.	Eats a little.	Did not eat.
10	Did not eat; greatly depressed.	Eats a little; depressed.	Eats a little; depressed.	Eats a little.

IV. Summary.

1. Solubility of White Leads in Human Gastric Juice.

a. White Lead Paint Dusts.

Solubility in pure gastric juice (25 cc. G. J. to 0.5 gr. lead).

Basic Lead Carbonate Paint Dust, 46 per cent.

Basic Lead Sulphate Paint Dust, 5.7 per cent.

Solubility in Gastric Juice + Peptone (25 cc. G. J., 0.1 gr. Peptone, 0.5 gr. Lead).

Basic Lead Carbonate Paint Dust, 46 per cent.

Basic Lead Sulphate Paint Dust, 7.3 per cent.

Solubility in Gastric Juice + Milk (G. J. 1—Milk 1).

Basic Lead Carbonate Paint Dust, none = 0 per cent.

Basic Lead Sulphate Paint Dust, none = 0 per cent.

Solubility in 0.5 per cent. HCl (25 cc. HCl to 0.5 gr. Lead).

Basic Lead Carbonate Paint Dust, 66 per cent.

Basic Lead Sulphate Paint Dust, 6.7 per cent.

Solubility in 0.5 per cent. HCl + Milk (HCl 1—Milk 1).

Basic Lead Carbonate Paint Dust, none = 0 per cent.

Basic Lead Sulphate Paint Dust, none + 0 per cent.

Solubility 0.5 HCl + Milk (HCl 2—Milk 1).

Basic Lead Carbonate Paint Dust, 25.4 per cent.

Basic Lead Sulphate Paint Dust, 1.5 per cent.

Solubility in 0.5 HCl + Milk (HCl 4—Milk 1).

Basic Lead Carbonate Paint Dust, 83.5 per cent.

Basic Lead Sulphate Paint Dust, 6.9 per cent.

b. White Leads.

Solubility in Pure Gastric Juice (25 cc. G. J. to 0.5 gr. Lead).

Lead Carbonate ("Old Dutch Process"), 53 per cent.

Basic Lead Sulphate, 25 per cent.

Solubility in Gastric Juice + Peptone (25 cc. G. J. to 0.5 gr. Lead).

Lead Carbonate ("Old Dutch Process"), 57 per cent.

Basic Lead Sulphate, 27 per cent.

Solubility in Pure Gastric Juice (50 cc. G. J. to 0.5 gr. Lead).

Lead Carbonate ("Old Dutch Process"), 69 per cent.

Basic Lead Sulphate, 30 per cent.

Solubility in Gastric Juice + Milk (G. J. 4—Milk 1).

Lead Carbonate ("Old Dutch Process"), 90 per cent.

Basic Lead Sulphate, 34.8 per cent.

2. Toxicity of White Leads when Fed to Dogs and Cats.

The lead carbonate is much more toxic than the lead sulphate. But both salts produce acute lead poisoning when given in quantities of 0.1 gr. per kilo body weight daily.

3. The Influence of Milk.

When milk and gastric juice is mixed in the proportion of 1–1, the hydrochloric acid of the gastric juice is so completely fixed by the milk proteins or neutralized by the carbonates in the milk that the mixture has virtually no solvent action on the lead salts, but when gastric juice is present in excess the lead salts go into solution in proportion to the excess of the gastric juice. When milk is taken into the stomach there occurs, of course, a similar fixation of the hydrochloric acid, and, in addition, the

total quantity of gastric juice is diminished owing to the inhibitory action of the fats in the milk on the processes of secretion.

4. *On the Basis of our Work we venture to offer these two Practical Suggestions.*

(1) The lead carbonate is so much more toxic than the lead sulphate that lead workers as well as the state should aim at the elimination of the use of the carbonate in all industries where this is possible.

(2) In addition to taking other important prophylactic measures, the lead workers should drink a glass of milk between meals (say 10 A. M. and 4 P. M.) in order to diminish the chances for any swallowed lead to be dissolved by free hydrochloric acid of the gastric juice, as in some persons there is considerable secretion of gastric juice in the empty stomach.*

*Hornborg: *Skand. Arch. f. Physiologie*, 1904, XV, p. 209; Carlson, *Am. Jour. of Physiology*, 1912, XXXI, p. 151.

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THE SCHOOL HYGIENE CONGRESS.

No community survey of school conditions has ever been made which has not brought out the need for better school sanitation and for better child hygiene. These surveys invariably find unsolved problems on the one hand and unapplied scientific knowledge on the other. The experts in school hygiene have yet much to learn while the schools of the land are on the average far behind in their application to their own affairs of the knowledge we already possess. Further scientific investigation and more practical scientific application is needed for the best solution of all of our problems, whether those problems be concerned with the heating of our school buildings, or with hook worms in our school children; with defective ventilation or defective vision; with architecture or adenoids; or with material equipment, muscular exercise, or the mentally exceptional child.

Thoughtful men and women are seriously concerned with this situation. This interest is becoming universal. The most impressive evidence to this

effect may be found in the reports which come from the various committees that are concerned with the organization of the Fourth International Congress on School Hygiene.

Additional evidence of the seriousness with which our communities in general are looking upon the problems of school hygiene is shown in the report that comes from the Committee on the Program for this Congress. This Committee now reports over three hundred papers.

We predict that the large group of delegates and the comprehensive program of papers will have a powerful and stimulating effect upon the practice of school hygiene here and abroad. We believe that because of this Congress many communities will be led to make surveys of their school conditions and having found a need for improvement, will make that improvement. The delegates, the attending members, the committees, and the printed proceedings of this Congress will work in unison to spread its influence powerfully, and, we believe, effectively so that the net results of this international enterprise may in time be evaluated in terms of improved school sanitation, greater physiological efficiency of the school child, and a more intelligent, enterprising and effective future citizenship.

In this connection we would like to point out the fact that consciously or unconsciously the Buffalo Citizens' Committee which is supporting this enterprise financially is performing a unique and extraordinary service in the interest of every American city possessed of an immigrant population. Boston, New York, Philadelphia, Chicago, San Francisco, and all the rest of them are seriously concerned with certain types in their alien populations. The Buffalo Citizen's Committee may have had no such altruistic motive in mind, but its activities in connection with this International Congress on School Hygiene may easily be productive of better conditions in foreign schools and thus lead to an improvement in our future immigrants who are spending or will spend their school lives under the influence of these conditions.

There seems now to be no question as to the success of this Congress. We judge from the reports that have reached us that this question is now only one of degree. And it deserves success, not only because its various committees are working unselfishly in the interest of these high ideals, but also because our communities in general need the stimulation and the information which this organization will give. With the support present of organizing committees in all the states of this country and in practically all the more important states and nations of the world; with the support of the women's clubs, dental associations, medical societies, educational associations and sanitary, scientific, educational and social organizations and institutions; with an attractive exhibit and an impressive program; with over twelve hundred official delegates from communities, organizations and institutions in all parts of the world; with a growing

membership of over twelve hundred—with all these forces now in active and effective operation. August 25–30, 1913, should mark a most important date in the history of school hygiene and the Buffalo Congress should become a powerful influence on the health of the human race.

TWO INVESTIGATIONS.

A recent report of investigations of the Dress and Waist Industry in New York City, made by the Joint Board of Sanitary Control, contains the following significant words, "It is with deep regret that we are compelled to make the statement that while sanitary conditions in the loft zone are excellent we are not certain that if a fire should break out today in one of the shops located in this zone there would not be great loss of life." About thirty per cent. of the shops have doors opening inward. Over fifty per cent. of the shops and about the same proportion of employees are located on or above the sixth floor.

The morning papers recently contained an announcement of another investigation. Referring to the recent fire of the Binghamton Clothing Company the usual comment is made that a "rigid investigation will be instituted by both city and state authorities."

Is this not a somewhat useless duplication of effort? We first proceed to make a careful diagnosis, then wait for the patient to die and then hold a post-mortem. We are doing either too much or too little. If it is only necessary to determine the cause of death, either the diagnosis or post-mortem is sufficient. The latter is undoubtedly more satisfactory because of its definiteness. But to prolong life we need the diagnosis followed up with suitable treatment.

In most cases we have laws and paid public officials; the power and means to deal with these sore spots in American industrial life. Too often the coroner's jury is called upon to fix the blame after the fact. None can avoid the conclusions that the real blame must be charged against our system of administrating the law by which paid public servants, sworn to uphold and enforce the law, fail so pitiably in their duties.

Not alone in cases of this kind but in all lines of public health endeavor we are confronted with the same situation. Our knowledge of combating diseases and protecting life is ten years ahead of our practice. Water purification is a well established science but a large percentage of our population is today drinking polluted water; methods for safeguarding the milk supply are known but epidemics of milk origin are reported with shameful frequency.

We need enlightened and fearless public officials who can and will enforce the laws and put into actual practice the knowledge which sanitarians and social workers have placed at their disposal.

THE RATS OF PROVIDENCE AND THEIR PARASITES.

GEORGE H. ROBINSON, A. M.
From the Providence Health Department and the Biological Laboratory of Brown University.

That rats are a factor in the spread of bubonic plague is an established fact. It has been confirmed beyond the shadow of a doubt, in India, in California, in England, and in other regions where plague is endemic. Rats dead of the disease have been found time after time in houses where outbreaks have occurred and immediate deratisation has effectively stopped further spread of the epidemic. These facts and a great amount of experimental work show that the rodent disease and that of human beings are identical.

Bubonic plague is originally a disease of rodents. Its home is thought to be the region of Thibet,[1] its natural host being the Tarbagan of that region. Other rodents are easily susceptible to the disease, as the hares of England, the ground squirrels of California, and the various species of the Muridæ found in all temperate and tropical regions of the globe. Owing to their universal distribution and great abundance the rats are to be considered as the greatest factor in the spread of bubonic plague.

When rats were first connected with the spread of the disease it was thought that they distributed the germs by contact with human food. The plague bacilli can be found in the mucous secretions, feces and urine[2] of infected rats and so there is some evidence in support of this theory. In 1898 Simond working in India demonstrated that plague could be transmitted through the bites of fleas. Later work by the Indian Plague Commission[3] and others has shown the rat flea to be the probable distributor of the disease.

To the cities along the Altantic coast of this country the spectre of plague is not very real but with the outbreak of the disease in the West Indies in 1912 it took on a more than ghostly substance to those conversant with the situation. American cities have an abundance of rats, the rats are presumably well supplied with fleas and it seemed only necessary for the introduction of the germs in order to bring about an epidemic. The Federal authorities required that all ships running between the infected region and American ports be fumigated and advised the municipal health officers to conduct an examination of rats.

In accordance with this recommendation an examination of the rats of Providence was undertaken under the direction of Dr. Charles V. Chapin, Superintendent of Health. The object of the work was to determine if

[1] Preble, Paul, The Tarbagan (Arctomys bobac) and Plague, Public Health Reports XXVII, 1912, 31.
[2] Baxter-Tyrie, C. C., Plague in Queensland, Journal of Hygiene, V, 1905, 315.
[3] Report of Plague Investigations in India, Journal of Hygiene, VII, 1907, 395.

possible the presence of any epizcötic among rats, the kinds of rats and the number and kinds of fleas on the rats. At first the work was confined to the water front, but later its scope was extended to the entire city.

The work began on July 18, 1912, and continued with several short intervals, up to the last of December. From the beginning of the examination until the first of September the rats were taken in traps along the water front. A daily patrol of the shore was also made in order to pick up any which might have died. Only three were found dead. About the first of November a bounty of five cents was offered for every live rat brought to the laboratory and 142 were purchased.

The technic of the examination was as follows: the rats were caught alive in the French wire traps and carried to the laboratory; there they were placed in a reservoir of illuminating gas for several minutes killing the rats and stupefying the fleas; the rats were then immersed in a weak solution of corrosive sublimate or formalin and left over night; during this time the putrefactive bacteria entered the circulation but a shorter exposure to the fluid was not sufficient to penetrate the thick fur and kill the parasites; the wet fur was then turned aside with forceps, the parasites were removed and their position on the body was recorded; the lymph glands were then exposed, the abdomen was opened and the appearance of the organs especially the liver was noted.

During the months July, August and September, 118 rats, and from October to January, 223 were examined, making a total of 341. These were evenly divided as to sex: 333 were the brown rat (Mus norvegicus), 2 were the roof rat (Mus alexandrinus), 1 was the black rat (Mus rattus), 4 were apparently crosses between the brown and roof rats, and 1 appeared to be a cross between the black and brown rats. The two specimens of the roof rat were taken from the New York-Providence boat and so were doubtless New York rats.

The size ranged from 18 to 46 c. m. (7 to 18 inches). Studying the brown rats by the biometric method we find them grouped about two distinct modes, those of 24 and 36 c. m. in length. Thus we have a clear differentiation into the adults and those which are still immature. Of these 59 per cent. were adults and 41 per cent. were young.

The results of the examination for fleas were as follows:

Total number of rats examined	341
Total number of rats infected with fleas	195
Total number of fleas	2053
Average fleas per rat	6
Average fleas per flea-infected rat	11
Largest number of fleas from one rat	300

Per cent. of fleas:[1]

Xenopsylla cheopis Rothschild	75
Ceratophyllus fasciatus Bosc	22
Ctenopsyllus musculi Duges	2.5
Ctenocephalus canis Curtis	0.5

By way of comparison it is interesting to note that in California the average fleas per flea-infected rat was 3.5,[2] and a yearly average of 2.7 was found. In India the average fleas per rat was 4.0.[3] All who have experimented are agreed that the two most numerous species which we found, Xenopsylla cheopis and Ceratophyllus fasciatus, will bite man. Concerning the others there is some dispute but since they comprise only 3 per cent. of all they are of little consequence.

During the plague epidemics in India and California much importance was made of the location of the primary buboes on the rats as indicating the point of inoculation or the flea bite. In India[4] 74.3 per cent. of the buboes were located in the cervical region. No data on the regional distribution of fleas on rats in India is available but on guinea pigs artificially infected by the Commission, 88.9 per cent. of the fleas were found on the head and neck. Pound[5] in Australia reports fleas as most commonly occuring on the head and neck of rats. In San Francisco[6] 72.4 per cent. of the buboes were found in the groin and none in the cervical region while 73 per cent. of the fleas on the rats were found on the hind quarters.

With these results in view the location of the fleas on the Providence rats was noted and the following results obtained; 16 per cent. on the head and neck, 16 per cent. on the fore legs and shoulders, 41 per cent. on the body, and 27 per cent. on the hind legs and pelvic region. These results hardly coincide with those found in other places. If we compare the relative areas of the different regions we find that they stand in about the same ratio as the percentages of fleas found on them. So it seems quite just to believe that the fleas are distributed with comparative uniformity over the body of the rat. However, with the oncome of cold weather there was noticed a slight change in position from the exposed portions of the body to the more thickly furred pectoral and pelvic regions. The exact figures were as follows:

	July-September	October-December
Head and neck	15 per cent.	16 per cent.
Front legs and shoulders	15 per cent.	16 per cent.
Body	46 per cent.	37 per cent.
Hind legs and hips	24 per cent.	31 per cent.

[1] Acknowledgment is made of the assistance of Mr. Nathan Banks of the Bureau of Entomology in confirming the identification of the fleas.

[2] McCoy and Mitzmain, The Regional Distribution of Fleas on Rodents, Parasitology, II, 1909, 301.

[3] Seventh Report of Plague Investigations in India, Journal of Hygiene Plague Supplement, January, 1913, 217.

[4] Report of the Indian Plague Commission, Jour. of Hygiene, VII, 1907, 386.

[5] Pound, Report of Plague in Queensland, 1900–1907, 143.

[6] McCoy, G. W. A Report on Laboratory Work in Relation to the Examination of Rats for Plague at San Francisco, Cal. Public Health Reports, XXIII, 1908, 1051.

The average fleas per rat for the months July to September was 10.2 and that for October to December was 3.7, showing a marked reduction during the colder months.

Twenty-one per cent. of all the rats were found to be infected with mites and they became more numerous with the onset of cold weather. Lælaps echidninus Berlese was the species found. In one case, at the Providence Coal Co. stable, a specimen of Myonyssus decumani, Tiraboschi, said to occur on Mus decumanus in Italy, was found. It is interesting to note that a short while previous to the capture of its host an Italian barkentine had docked near that point. The common rat louse Polyplax spinulosus Burmeister was found on 24 per cent. of the specimens. On 12 per cent. were found open sores.

No numerical study of the occurrence of internal parasites was made except in cases where the liver was affected. This condition was found in 7 per cent. of the rats and was due to the encysted form of the cat tapeworm Tænia crassicollis and to the ova of some unknown parasite found also by McCoy[1] in California. One noticeable and possibly significant fact is that from two meat markets from which were obtained 15 and 22 rats, respectively, both these parasites were present in the liver in 25 per cent. of each lot. A bladder worm was present in all of six cases which were examined.

The question as to whether there is a relation between the filthiness of the home of the rat and the number of fleas is of interest. The dirty rats of the stables and docks might be expected to bear more fleas than would the cleaner rats of other localities. It was found in these investigations, however, that the average fleas per rat from the stables, and docks was especially low, in but few cases exceeding one flea. On the other hand the averages from the cleaner places were generally higher. The average from a restaurant from which 40 rats were taken was 36 fleas. That from a creamery was 22, from a dwelling house 10, from another 8, from a drygoods store 10, from a bar room 1, from two markets 1 each. The reason for this is doubtless that the fleas breed in the nests of the rats[2] and are only on the bodies of the rats to feed. So a damp, cold location of the nests would strongly inhibit the breeding of the fleas.

The conclusions from our study of the rat situation in Providence are that rats are present in large numbers and cannot be exterminated until the city is rebuilt with ratproof construction; these rodents are supplied with as many fleas as are those in plague infected regions; opportunity for the fleas to bite human beings is always present as the rats are for the most part closely associated with man. It would seem, therefore, that only the germs of plague are lacking to complete the mechanism of an epidemic in Providence.

[1] McCoy, G. W. Pathological Conditions found in Rats, Public Health Reports, XXIII, 1908, 1365.
[2] Reports on Plague Investigation in India, Journal of Hygiene, VIII, 1908, 241.

PUBLICITY IN PUBLIC HEALTH WORK.

WOODS HUTCHINSON, M.D.
New York.

Read before the Municipal Health Officers' Section American Public Health Association, Washington D. C., September, 1912.

I think it is one of the most significant signs of the progress of the times that the question of publicity by doctors is allowed to be discussed in an assembly largely composed of doctors. The doctor of twenty-five years ago was the most private person imaginable. He was scarcely allowed to speak in public at all for fear he might give away trade secrets. Publicity is, in my judgment, one of the principal things in connection with health work. I think most of us have rather undergone a change of attitude, in that regard, toward the community and toward our work for the community. I think our old feeling used to be that what we longed for was a good strong law and plenty of legal backing and then to be able to put right through what was good for the people, whether they liked it or not, as is done with such admirable results in Germany. But I think if real results are counted, these should be measured by getting people to live and act in a sanitary manner of their own accord. We speak of the backward condition of public health matters in America. I believe that we are laying here the foundations for a broader, better and more intelligent form of sanitary life and work by the community than in any other country of the civilized world at present.

The next question is, how and where are we to get this publicity? Through the organs already established for that purpose, the newspapers. I ask the question, how are we to get publicity? It would be more correct to ask, how are we to avoid it? The people are eager for it; they are anxious to get information bearing on health and the protection of themselves and their families and children from disease. I think, whatever our political views may be—whether Democrats, Republicans or Progressives—we cannot but be struck with the immense significance of the fact that one of the presidential candidates, whom all who know him, whether they agree with him or not, consider one of the keenest and shrewdest politicians and best judges of public sentiment we have ever had, has chosen to make his campaign largely on a platform of public health improvements and social betterment. It is a tribute to the American physician such as has never been paid before. Health has become a popular issue and is becoming more popular and more constantly in demand by the people all the time, and all we have to do is to fall in with these requirements and get rid of the idea that it is not becoming in us to speak of the secrets of our

profession and to publicly discuss science for fear we shall be misunderstood by the public.

How shall we get our message to the people on those subjects? First of all, it must be made in a manner to be clearly understood by the people and we need not hesitate to use the utmost frankness. We shall always have to face the risk of a certain amount of misunderstanding.

We should, of course, be cautious in the use of difficult and unusual terms, but, apart from that, I believe we can trust the intelligence of the American people to almost any extent. I believe it is not by any means necessary for us to assume that we must tell them only what is absolutely true and fixed and certain beyond possibility of doubt. Let them know the new things; let us take them into our confidence and show them what is happening. Don't pretend to know it all, but show them how things are growing and developing and tell them frankly that this is the best we know in the present state of our knowledge and as soon as we know any better, we will tell them, and I believe they will return our confidence and form their own judgments and act upon the things we put before them in a much more intelligent and reasonable way than we might be inclined to think.

The other attitude we ought to assume in dealing with the public on health matters is an attitude of becoming modesty; not to give it as something which has been revealed to us as coming down from Sinai, but to remember the exceeding recentness of much of our scientific knowledge. There was an ancient tradition of mystery in medical matters and there was a good deal of sound judgment in that veil of mystery up to twenty-five or thirty years ago, because we didn't have so very much to tell that would have stood the light of publicity.

I have sometimes thought that we fail to recognize to what a high degree the errors and illusions and obstacles, which we are fighting in the public mind, are the things that our ancestors in the medical profession of two hundred years ago taught the people. We must remember that we have only come into the heritage of our knowledge quite recently. Kipling has put it neatly in his poem "Our Fathers of Old"

"Excellent herbs had our fathers of old,
Excellent herbs to ease their pain;
Poppy and monks-hood and marigold,
Eyebright, orris and elecampane,
Anything green that grew out of the mold,
Was an excellent herb to our fathers of old."

Then he praises their courage and devotion, but winds up:

"Wonderful little when all is said,
Wonderful little our fathers knew,
Half their remedies cured you dead,
Most of their teaching was quite untrue,
Look at the stars when a patient is ill,

Dirt has nothing to do with disease,
Bleed and blister as much as you will,
Blister and bleed him as much as you please,
Whence enormous and manifold
Errors were made by our fathers of old."

We should remember that we have that sort of tradition behind us, and not expect people to take us all at once at our own valuation as full-fledged angels who are merely on earth to make life happier. Another thing I think we can depend upon and that is an appeal to the desire for well doing and for kindliness in the mass of the community. We often, I think, are inclined to lose patience with the ignorance of the masses of the community, and with the selfishness and greed of the more successful classes, but a great deal of both is due solely to ignorance. They hardly realize what they are doing when they are grinding down the working sixty per cent. of the community with low wages and bad sanitary surroundings and long hours and overwork. We must be patient with them and appeal to them, and I believe the more we have to do with the masses of men and the nearer we come to them, the more we shall come to believe in the kindness of men, in the goodness of women and in their readiness to respond to anything which makes for the health and happiness of their children. I sometimes used to think, when I was a public health officer, that if I could only have the feeling that the community, or even a part of it, felt that by our existence and activity, his little one could sleep in greater safety, it would be one of the greatest possible triumphs and most satisfactory sense of having done something really worth while. I cannot conceive of any man in any profession, of any type of worker, where this sense is surer than in the public health officer, who has tried to do his duty and to help his time and improve the surroundings for little children. Who is more certain when he comes to that Last Judgment, the verdict of history, to hear from the Spirit of the Nation, "Inasmuch as ye have done it unto the least of these, my little ones, ye have done it unto Me."

BACTERIOLOGICAL INVESTIGATION OF AN OUTBREAK OF SEPTIC SORE THROAT IN BALTIMORE—ABSTRACT.

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Baltimore, Md.

(From the Bacteriological Laboratory of the State and City Boards of Health, Baltimore, Md.)

Read before the General Sessions, American Public Health Association, Washington, D. C., September, 1912.

In the latter part of February and in March of the present year it became evident that there was a marked outbreak in Baltimore of an unusual type of throat infection associated with or followed by one or more of the following conditions: cervical adenitis, septicæmia, peritonitis and erysipelas. The situation became so striking that it led to a meeting of certain physicians who, in their practice, were seeing numerous cases of the so-called "septic sore throat." At this conference it was learned that a very large proportion of the cases was occurring on the route of a particular dairy (Dairy No. 1), owned and operated by one of the most intelligent and enterprising men in the business.

Directly sequent to this the health department made a bacteriological investigation of this milk supply and an examination of the herds of those shippers whose milk fell under suspicion. The inquiry made by the department into the possible relation of the milk from Dairy No. 1 to this epidemic is, therefore, divisible into a laboratory and a field investigation.

The laboratory study of the epidemic is separable into that of the pasteurized product, that of the raw milk, and that of cultures from the throats of the employees of the dairy and from cases of the disease.

Examination of Pasteurized Milk from Dairy No. 1.

For some years prior to the time of the occurrence of this inordinate number of cases of septic sore throat among the patrons of Dairy No. 1 the proprietor had been pasteurizing all his milk at a temperature of 158° to 165° F. for two and a half to five minutes. However, just before the outbreak reached its climax, but nevertheless after it was well started, pasteurization was temporarily interrupted by repairs being made to the apparatus. The operation of the plant was stopped on January 29, but the exact date when pasteurization was begun can not be determined; however, it was not later than the 5th of February. During this time raw

milk was supplied to the clientele, as this was thought a safe procedure owing to the intensely cold weather. In justice to the owner of the dairy it should be stated that as soon as his attention was called to the undue incidence of the disease on his customers he not only consulted a well-known sanitarian, but also accepted his recommendations, including the installation of a plant for the pasteurization of milk at 145° F. for thirty minutes. The new pasteurizer was placed in operation in the 19th of March.

Milk was collected at this plant before the new holding device was installed and centrifugalized in quantities of fifty cubic centimeters for thirty minutes. From the sediment cultures were made on the surface of agar plates. Colonies fished from these were studied on various culture media, and the organisms isolated corresponded in all respects to the Diplococcus pneumoniæ. When inoculated subcutaneously into white mice they produced a fatal septicæmia, the diplococcus being recovered from the liver, spleen and heart blood.

We also subcutaneously inoculated white mice with the sediment from this milk. These animals, however, did not die.

Raw Milk Collected at the Railroad Stations.

The department started to examine the milk shipped to Dairy No. 1 on March 20, the samples being collected at the local depots. The two hundred and fourteen milks brought to the laboratory were examined by the Slack method for pus and streptococci. Owing to the fact that each specimen represented the mixed milk of several cows, any sample showing ten pus cells or more per field was regarded as suspicious. As a result of this twenty-three were subjected to further investigations.

The sediments from these milks after centrifugalization were suspended in normal salt solution and half of each was injected into a mouse. Fourteen of these animals died and Gram-positive, lancet-shaped diplococci with capsules were found in smears from the liver, spleen and heart blood.

From each of these dead animals plate cultures were made from the various organs, and in six instances we isolated microörganisms corresponding morphologically and culturally to the pneumococcus. From one of the autopsies we also obtained the Streptococcus pyogenes.

From the same animal we recovered a Gram-positive coccus occurring in pairs or in chains of from ten to twenty organisms surrounded by a distinct halo or capsule; the chains were formed of paired cocci, and there was either no constriction in the capsule or but a very slight one between these intracapsular groups. This organism produced cloudiness in broth, acidulated and coagulated milk, did not liquefy gelatine, failed to produce any change in inulin serum-water, and rendered Libman's dextrose-serum-agar very cloudy. On blood-agar the microörganism grew as moist col-

onies with a tendency to spread, and produced a zone of hemolysis. There was acid production in dextrose-, lactose-, saccharose-, and maltose-bouillon, but none in inulin, raffinose, or mannite. Later this streptococcus fermented raffinose-broth. It, therefore, closely resembles, morphologically and culturally, the descriptions of the Streptococcus epidemicus. Subcutaneous inoculation into a white mouse resulted in death within twenty-four hours. The post-mortem discovered marked purulent peritonitis, and the streptococcus was isolated from the peritoneal fluid and from various organs.

Milk Collected at Dairy Farms.

As soon as the milk of any shipper was found suspicious as a result of the pus and streptococcus count, inspectors were sent to the dairy farm and samples of milk separately collected from each cow. These specimens were subjected to the same examinations as have been previously described. As a result of this we found six milks showing pus cells in excess of twenty-five to the field. In one case the count was approximately one hundred, and the cells occurred in large masses obscuring the field. This latter milk was from a cow on the dairy farm of the shipper from whose product the organism resembling the Streptococcus epidemicus had been recovered.

Although animal inoculations were made from the sediments of these various suspicious samples we failed to isolate any organism other than the pneumococcus. This was obtained from five of the fifteen mice injected with these different sediments. From the milk showing the above mentioned high pus count, we failed to isolate any streptococcus- or pneumococcus-like organism at autopsy owing to the fact that the cultures were overgrown by colon bacilli.

Cultures from the Throats of Employees of Dairy No. 1.

Forty-six cultures were made at the pasteurizing plant from the family and employees of the owner, there having been several cases of sore throat at this place. These cultures were examined microscopically, and all showing diplococcus and streptococcus forms were plated out. There were thirty-four such cultures and from thirty-one of these we isolated bacteria resembling in all respects the Diplococcus pneumoniæ. Pure cultures of these organisms were inoculated subcutaneously into white mice, but were not pathogenic except in three instances.

From one of these thirty-four cultures we obtained a typical streptococcus of the septic sore throat type, it corresponding in most respects to those isolated from cases of the disease and to the organism obtained from the milk. It did not ferment raffinose broth or coagulate milk. This streptococcus did not kill white mice when inoculated in rather large

doses. It was obtained from the throat of one of the drivers who himself had not been ill.

Cultures from Cases of Septic Sore Throat.

At the laboratory we recovered the Streptococcus epidemicus from two cases, the organism being obtained from the inflamed throat. These were compared with cultures that had been isolated from the peritoneum and from the lymph glands of three other cases of this disease. Two of these latter cultures came from the laboratory of Dr. Charles Simon, while the third was from the Union Protestant Infirmary. These five cultures corresponded to one another in all the essential characteristics. However, both of our organisms acidulated raffinose broth, while one from the lymph gland failed to ferment this medium. Neither of the children from whom we obtained the Streptococcus epidemicus drank milk from the dairy under suspicion and both were probably contact cases, as there were a number of other infected pupils in the schools which these children attended.

Inspection of Dairy Farms.

As soon as the milk of any shipper came under suspicion, as determined by pus counts made on samples collected at the railroad stations in Baltimore, an inspector was sent to the dairy farm. Here, as already stated, specimens were collected from each cow for further examination. In addition to this, however, physical examinations were made to determine the presence or absence of garget in the various herds. This resulted in the discovery of several cases of garget on different farms, but these cows, however, were not being used at the time of the inspection. The cow in whose milk we found the enormous number of pus cells failed to show any physical evidence of mastitis; nor was there any other case of garget in this herd. It was from the mixed milk of this shipper, nevertheless, that we were able to recover the Streptococcus epidemicus.

Furthermore a careful inquiry was made on all the dairy farms to determine whether there had been any cases of septic sore throat. This failed to elicit any history of the disease, although one of the shippers stated that he had had several mild attacks of sore throat during the winter season.

Conclusion.

From the bacteriological investigation we feel reasonably certain that the outbreak of septic sore throat in Baltimore was largely due to milk that had not been thoroughly pasteurized.

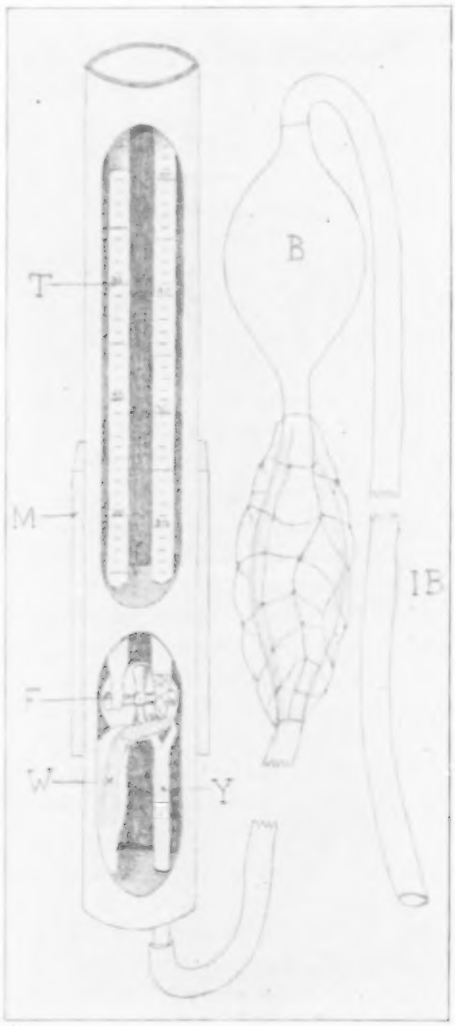
We desire to thank Dr. Frederick C. Blanck and his corps of inspectors for the great assistance they rendered us in this investigation.

A CONVENIENT PSYCHROMETER.

EUGENE C. HOWE.

Department of Hygiene and Physical Education, Wellesley College.

The figure appended shows a compact apparatus for determining relative humidity. Two thermometers (T) are held in a cylindrical brass case, to the back of which is attached a small clock-spring motor (M) which drives



the Fan (F). B is a cautery-bulb connected with the y-shaped jet (Y). Ventilation of the wet bulb may be accomplished either with fan or with bulb with the same results, though the latter is more fatiguing.

The bulb of the wet-bulb thermometer is prepared in the following way: It is dipped in Japan Gold-size and the surplus wiped off so as to leave an imperceptible layer. Then a leaf of gold or copper foil is applied and on this is deposited a heavy coat of platinum black. Water is led up to the base of the bulb by the wick (W) and from there is spread by the platinum coating aided by a few threads of the wick criss-crossing snugly over the surface of the bulb. A large fraction of the latter is left exposed, however, so that the heat absorbed from the mercury in evaporation may pass promptly to the evaporating layer instead of having to traverse an insulation of fabric. Quick action is thus assured, forty seconds ventilating (with the thermometer used) being sufficient under ordinary conditions to produce a minimum reading, and a minute being ample. There may be other ways of preparing a bulb for prompt delivery of latent heat, but the method described is not so fussy as it sounds.

The instrument is suited to and has been successfully used in places where unobtrusiveness is desired, such as reading rooms, crowded street cars, etc. But under any circumstances there is not the danger of breakage that accompanies the use of the swing-psychrometer, through inadvertant contact with chandeliers, furniture, or human heads.

The cautery-bulb ventilation is suitable for determination of humidity in places not easily accessible to ordinary hygrometers (of the "swing" and other types), such as spaces between clothing. It is then necessary to insert the inlet tube (IB) of the bulb in the place for which the humidity determination is desired. Day bulb readings in such cases are, of course, gotten with a separate thermometer.

Stratified humidity in rooms is easily determinable.

NOTES ON THE EXAMINATION OF SOFT CLAMS FOR POLLUTION.

(Abstract.)

STEPHEN DEM. GAGE.

Read before the Laboratory Section, American Public Health Association, Washington, D. C., September, 1912.

The shellfish problem in Massachusetts is quite different from that in most states in the fact that the bulk of the shellfish catch is composed of soft clams. The consumption of these clams is greatest in summer when oysters are out of season, and unlike oysters and hard or Little Neck clams, the soft clams are never eaten without cooking, which fact has to be taken into consideration in determining what degree of pollution may be dangerous.

Systematic examinations of clams from locations of varying degrees of pollution show that while there may be considerable fluctuation in the numbers of bacteria and B. coli at different times, the regular seasonal variation in the bacterial content which has been reported in oysters cannot be detected in the case of soft clams.

A considerable portion of the soft clam catch is shucked and washed before marketing, and bacterial examinations of the liquor of market shucked clams give little indication regarding the original pollution of the areas from which these clams were gathered, although they may yield some information as to the conditions under which the shucked clams have been held. B. coli and similar organisms are frequently found in large numbers in the content of the alimentary canal of such clams, and in such cases pollution at the source is indicated, although the liquor of the shucked and washed clams may be entirely free from B. coli. The suggested "Standard Methods for Examination of Shellfish" make no provision for any tests of the meat, although the meat is the portion which is eaten and only a very small part of the liquor or shellwater upon which tests are usually made is consumed. Such B. Coli tests as have been made at times on the intestines or other portions of the meat are qualitative only, and at best can only indicate pollution without showing the degree thereof. It is quite evident, therefore, that reliable quantitative methods are much needed especially for the examination of "shucked stock."

During 1912 extensive studies of methods for determining the numbers of bacteria in shucked clams have been in progress at the Lawrence Experiment Station. In the method which shows the most promise, a considerable number of clam bodies are ground fine in a sterile meat grinder, and

a weighed portion thoroughly mixed with a known volume of sterile water, counts on agar at room temperature, on litmus-lactose agar at body temperature, and fractional tests for B. coli, being made on the mixture. The types of bacteria determined at body temperature do not multiply to any extent under the conditions under which shucked clams are usually kept for market, and counts at this temperature indicate with fair accuracy the condition of the clams at the time they were gathered. The room temperature counts furnish some measure of the conditions under which the clams have been kept and the time which has elapsed since they were shucked, while the B. coli tests yield confirmatory evidence of pollution. The results, expressed as numbers of bacteria per gram, are directly comparable with one another and enable a comparison to be made with the bacterial content of other foods. Using this method of analysis, experiments are in progress to determine the probable danger from the consumption of soft clams from polluted areas after cooking by different methods.

In the "Standard Methods" for examination of shellwater, and of liquor from shucked stock, bacterial counts on agar at both room temperature and body temperature are recommended. Judging from experience in the examination of soft clams, litmus-lactose agar is much to be preferred for the body temperature counts. Careful experiments with sea-water and shellwater from soft clams show that the counts obtained on both agar and litmus-lactose agar at this temperature are practically identical. The use of litmus-lactose agar, however, permits a differentiation between the types of bacteria, which at times is of great assistance in the interpretation of the results.

Attention was called last year to the discordant results which are often obtained in the bacterial counts on sea-water and shellwater of clams and oysters, these being attributed to the destruction of the bacterial cells by osmosis through the sudden change in salinity by dilution with fresh water during plating. Experiments have shown that errors from this source are considerably reduced if all dilutions are made in a one-per cent. solution of common salt instead of in fresh water. Furthermore, higher and much more uniform counts are obtained on both agar and litmus-lactose agar if one per cent. of salt be added to these media when making plates of sea-water or of shellfish samples.

THE SOURCE OF AMMONIA AND NITRITES IN A NITRATE-PEPTONE SOLUTION.

I. J. KLIGLER,

Department of Public Health, American Museum of Natural History, New York.

Read before the Laboratory Section, American Public Health Association, Washington, D. C., September, 1912.

The reduction of nitrates has been considered for some time a valuable test in the recognition of certain types of organisms. The presence of either nitrites or ammonia in a solution of nitrate peptone broth is taken as an index of such reduction, both of these radicals being supposed to be formed by the breaking down of the nitrates. This assumption is apparently made by Gorham who recommends the use of a tap water solution of peptone nitrate broth incubated for 7 days at 20° C in order "To determine the power of certain bacteria to reduce nitrates to nitrites and ammonia." Park gives directions for the testing of ammonia and nitrites in a nitrate bouillon broth in order to determine nitrate reduction. Winslow and Winslow in their study on the cocci go a step further in assuming that ammonia may be formed by the reduction of nitrates directly without nitrites being present at all. They used standard nitrate solution, containing peptone and "tested for nitrites and ammonia in the regular way." Further on they state that "apparently some of the cocci produce ammonia in peptone nitrate broth medium without formation of nitrites."

The writers go on to say:

"It was thought at first that this difference might be due to the fact that different strains carried out, more or less completely, a reduction, first from nitrates to nitrites and then from nitrites to ammonia. A special study was made of this point, by inoculating a series of tubes with certain selected cultures and examining one tube a day for two weeks, and by inoculating large flasks of nitrate medium and withdrawing portions for examination at intervals for three weeks. These experiments showed that in some cultures nitrites appeared first, while both nitrites and ammonia were found on succeeding days. With other cultures nitrites alone were found, and with still others the ammonia test alone was positive, day after day. Apparently some of the cocci produce ammonia in the peptone-nitrate medium without the formation of nitrites. In a very careful study of the action of sewage bacteria upon nitrates, Gage (1905) has shown that the direct reduction of nitrates to ammonia without the intermediate production of nitrites is unquestionably accomplished by certain forms."

All through there is the consistent assumption that the ammonia must come ultimately from the nitrate present. The new report on Standard

Methods of Water Analysis (1912) does recognize that ammonia may be formed from the organic matter of the medium and not from the nitrates. In order to decide this point it is suggested that a broth culture should be tested for ammonia and the result compared with that obtained from the nitrate broth. In view of the marked differences in growth between a broth culture and one in a nitrate peptone solution, this procedure seems of somewhat doubtful value. The assumption that ammonia is formed by the reduction of nitrites seems to be based very largely on the work of Maassen who after a series of careful experiments arrives at the conclusion that "in peptone free solutions the formation of ammonia follows that of nitrites as the second phase in the nitrogen assimilation process." Jordan states that "the ability to reduce nitrates to nitrites and ammonia is a widespread bacterial characteristic; Maassen who investigated 109 kinds of bacteria found 85 to possess this power." This implies that the 85 could reduce nitrates to nitrites and ammonia, whereas, as will be seen later this series of 85 gave positive tests for nitrites, with no ammonia test recorded. Hiss and Zinsser base a similar statement on the work of Maassen. Maassen's experiments fall into three groups. He first tested 109 organisms in pepton nitrate solutions and found 85 showing positive nitrite tests. In his second series he tried to determine the ability of the organisms to reduce nitrites. He found that the organisms will live only in the presence of minute amounts of nitrites and that 59 out of 109 gave no reduction of nitrites although 41 of the 59 were able to reduce nitrates. The other 50 showed a diminution of nitrites and to see whether ammonia was the end product to be incubated 27 organisms in media free from organic nitrogen, using potassium nitrate and carbohydrates as nitrogen and carbon sources respectively. After four weeks incubation he found on distilling his solutions over caustic soda five distinct positive ammonia tests and slight traces in a number of the others.

From the results of these experiments, he arrives at the conclusion that in peptone free media the nitrates are broken up with the eventual formation of ammonia. It seems possible however, that distillation may cause the breaking down of weak nitrogenous organic compounds, formed in the solutions as a result of bacterial metabolism, with the liberation of ammonia. Furthermore the fact that Maassen obtained ammonia in peptone free media after four weeks incubation does not justify us in assuming that ammonia found in a peptone nitrate solution after 10 days incubation is an index of nitrate reduction. Gerlach and Vogel tested a number of organisms in solutions where nitrates were the only sources of nitrogen and found that the nitrates were reduced to nitrites. Later the nitrites disappeared and a determination of total nitrogen showed a loss of nitrogen although throughout the entire series no ammonia could be detected.

The only quantitative work I have been able to find is that by Gage, who

finds what he calls ammonia from nitrates in 5 out of 20 cases and ammonia from peptone solution in 18 out of 20. He determined his nitrate ammonia, however, in an indirect way which makes the results of doubtful value. He determined the ammonia in a peptone solution and that in a nitrate peptone solution and subtracting obtained the amount of ammonia derived from nitrate reduction. Of the 5 so-called positive cases two showed ammonia far in excess of the amount of nitrates reduced. Considering that we are dealing with biologic experiments, that the growth of the same organism in two different solutions (peptone and nitrate peptone) is not necessarily uniform, and that the reactions within the culture tube are as yet unknown to us, this is a somewhat slender proof that the ammonia is derived from nitrates.

In the course of a study of the nitrate reducing power of the cocci, I observed as did the Winslows that in some cases, notably among the saprophytic yellow cocci and sarcinæ ammonia alone and no nitrites was produced. Repeated tests confirmed these observations. The work presented in this paper is the result of an attempt to determine the exact source of the ammonia.

Fifty-four strains of cocci, thirty-five of which showed reduction of the standard peptone nitrate solution to nitrites, ammonia or both, were inoculated into solutions of 1% peptone broth and nitrate-peptone broth respectively. The solutions were at first made up with tap water according to standard methods. Each strain was inoculated into five tubes of each of the two solutions and incubated with controls for 7 days at 20° C. The tubes were then tested by standard methods for nitrites and ammonia. The two sets of tubes were compared with their respective controls and each other and the results recorded as:

(1), + (better in peptone solution)
(2), + (better in nitrate-peptone solution)
(3), + (same in both solutions)
(4), − (negative in both solution)

The first series of tests showed the presence of nitrites in the peptone solution to which no nitrate was added, in every one of the 18 cases in which nitrites were formed in the nitrate solution. The test was therefore repeated in solutions made up with distilled water to which inorganic salts were added. The solutions were made up as follows:

(1) Peptone solution

H_2O	1000 C. C.
Peptone	10 gms.
K_2HPO_4	.2 "
$MgSO_4$	.1 "
NaCl	.2 "

(2) Nitrate solution

Same as above with addition of

KNO_3 .2 gm.

All the salts added were chemically pure.

While some of the organisms did not grow quite so well in this solution, the results obtained were very striking. The organisms tested grouped themselves into four classes: (a) those that produced nitrites only; (b) those producing ammonia only; (c) those producing ammonia and nitrites; (d) those producing neither ammonia nor nitrites. All organisms producing nitrites only, gave a positive test for nitrites in the nitrate-peptone solution, and a negative one in the peptone solution. Those that produced both nitrites and ammonia showed nitrites and ammonia positive in the nitrate peptone solution, while in the peptone, the nitrite was negative and ammonia positive. Those that produced ammonia only, gave positive tests for ammonia in both solutions and negative tests for nitrites in both. Non-reducers gave negative results in both solutions. In the majority of cases the amount of ammonia produced by an organism was the same in the two solutions. As was to be expected some showed stronger in the peptone solution while others gave stronger reactions in the nitrate solutions. The results are summarized in the following tables:

TABLE I.

PRODUCTION OF AMMONIA AND NITRITES IN PEPTONE AND NITRATE PEPTONE BROTH.

Type	No. of Cultures	Ammonia produced in		Nitrites produced in	
		Peptone	Peptone-Nitrate broth	Peptone broth	Peptone-Nitrate broth
A	5	−	−	−	+
B	17	+	+	−	−
C	13	+	+	−	+
D	19	−	−	−	−

TABLE II

AMMONIA PRODUCTION IN PEPTONE AND NITRATE PEPTONE BROTH.

Type	Total No. in each	Better in		Equally good in both
		Peptone broth	Nitrate peptone broth	
A	5	0	0	0
B	17	4	3	10
C	13	3	1	9
D	19	0	0	0

Table I brings out very clearly the source of both the nitrites and the ammonia. The former is evidently the result of the breaking down of the nitrates, while the latter is evidently derived from the peptone. The differences observed in the two solutions as shown in table II are attributable to the non-uniformity of conditions which prevail in this as in any other biological experiment.

Summary and Conclusion.

1. Fifty-four strains of cocci were tested in peptone and nitrate peptone solution in order to determine the source of nitrites and ammonia.

2. The results show that the organisms tested reduced nitrates to nitrites only.

3. The ammonia was apparently the result of the breaking down of the peptone and not an end product in the reduction of nitrates.

4. The cocci generally do not reduce the nitrates in a nitrate-peptone solution to ammonia. A study of the literature leads me to believe that this is very possibly equally true of other bacteria. While there may be organisms that reduce nitrates to nitrites and eventually to ammonia under certain conditions, and while this may even be possible in the standard peptone-nitrate broth, we are not justified in assuming that the presence of ammonia in peptone-nitrate broth signifies nitrate reduction.*

5. The peptone-nitrate solution should be made up with distilled instead of tap water as recommended in the Standard Methods, as the presence of nitrate impurities in the latter will often seriously vitiate the tests.

In conclusion I wish to express my gratitude to Prof. Winslow for his help in the preparation of this paper.

References.

Gage, S. DeM., 1905. *Contribution to the Biochemistry of Sewage purification; the Bacteriolysis of Peptones and Nitrates. Journal of Am. Chem. Soc. Vol. XXVII, 327.*

Gerlach and Vogel, 1901. *Ueber eiweisbildende Bakterien, Cent. f. Bakt. Part 2, Vol. VII, p. 609.*

Gorham, F. P., 1901. *Laboratory course in Bacteriology.*

Hiss and Zinsser, 1910. *A Text Book of Bacteriology.*

Jordan, E. O., 1910. *General Bacteriology.*

Maassen, Albert, 1901. *Die Zersetzung der Nitrate and Nitrite durch die Bakterien, Arbeiten aus dem Kaiserlichen Gesundsheitsamte. Vol. 18.*

Park and Williams, 1910. *Pathogenic Bacteria and Protozoa.*

Standard Methods of Water Analysis, 1912.

Winslow, C.-E. A. and A. R., 1908. *Systematic Relationships of the Coccaceæ.*

Since this paper was written G. Harold (Annual Report (1911) of the Director of the Department of Marine Biology, Carnegie Inst.) has reported the existence of strong denitrifying organisms in tropical sea water which possess the power of producing nitrites, ammonia and free N. in a solution of salt water, calcium malate, sodium acid phosphate and potasium nitrate.

Addenda to Dr. John S. Fulton's Article Entitled "The Medical Statistics of Sex Hygiene; Such as They Are," Which Appeared in The June Journal, p. 661.

The recently published Abstract of the Thirteenth Census enables me to correct the figures in my paper on the medical statistics of sex-hygiene. When my paper was written, the age, sex, and marital distributions of population, for the year 1910, were not available. I obtained the distinction for sex by taking half, and that for ages above 15 by taking two-thirds of the populations. The differences of sex and age distribution, under urban and rural conditions, were ignored, as unlikely to cause any important error.

The Census bulletin quoted in my paper has been corrected in the Abstract as to the number of places included in the urban population. Three cities, Texarkana, Union City, and Bristol, were counted twice in the bulletin, giving 2176 cities, instead of 2173, in the seventh class. This reduces the total number of cities to 2402, and together with other corrections reduces Dr. Willson's total of 2,177,400 prostitutes to a total of 2,172,600.

In the table printed on the following page, I have lumped three urban groups, the fourth, fifth and sixth, into one group of 210 cities. I am not sure about my figures for the seventh group. I am not industrious enough to sum the female populations of 2173 cities, and I doubt if the Census Abstract accounts for them all. There are enough numerical discrepancies in my paper to afford good sport to any one who has a passion for unscrambling eggs. The best of these errors is in the proportion of married females.

Comparing this table with my former table, it will be found that six rates are diminished and four are augmented. Their effect on my criticism of Dr. Willson's reasoning is unimportant. In the light of these corrections I can say that his low guess, applied to the 44,639,989 females in the United States, would give 607,104 prostitutes, public and clandestine. His high guess would give as few as 11,356,413. Quite a range! Under the terms of his "ultraconservative" average (1424), the average man can believe, with all the enthusiasm of a 71 per cent. probability, that he is the father of his son and the son of his father. He can cherish a 43 per cent. probability that his mother, his wife, one sister, and one daughter are all virtuous. For the average citizen of the seventh class city, the faith that he is the father of his son and the son of his father can be rationally supported by assuming a 70.66 per cent. probability that his father was, and his son will be, only half as fortunate. Perhaps Dr. Willson did not mean to say such things, but such is the meaning of what he said.

	Population, 1910.	Prostitutes, public and clandestine.	Females, all ages.	Rate per 10,000 females.	Females above 15.	Rate per 10,000 females above 15.
3 cities	8,501,174	84,000	4,232,465	198	3,041,850	276
6 "	3,427,579	50,000	1,683,861	297	1,240,446	403
10 "	3,532,927	24,000	1,760,923	136	1,206,365	199
210 "	13,082,136	276,200	6,621,364	417	4,767,362	579
2,173 "	14,079,567	1,737,400	6,828,488	2,544	4,917,510	3,533
2,402 "	42,623,383	2,172,600	21,127,202	1,029	15,333,853	1,424

John S. Fulton.

Baltimore, July 25, 1913.

PRELIMINARY ANNOUNCEMENT OF THE COLORADO SPRINGS MEETINGS.

September 9-13, 1913.

OFFICIAL CALL

July 1, 1913.

The Forty First Annual Meeting of the American Public Health Association will be held at Colorado Springs, Col., from September 9th to 13th. The programs for the General Sessions of the Association, as well as those of the Sections, are well advanced and promise to be timely, interesting and progressive.

The location of Colorado Springs is geographically favorable to a large part of the membership and it is therefore hoped that the attendance will be large and that the attending members may thoroughly discuss the important subjects to be presented.

The two sections recently created have elaborated comprehensive programs and it is expected that they will elicit as valuable discussions as do the older sections.

It is also expected that the local committee will add to the enjoyments of the meeting by facilitating numerous excursions into the beautiful environment, which holds the reputation as being one of the prominent health resorts of the continent.

RUDOLPH HERING,
President.

PRELIMINARY PROGRAM FOR THE GENERAL SESSIONS

OFFICERS 1912-1913.

President, MR. RUDOLPH HERING, New York, N. Y.
First Vice-President, DR. W. R. BATT, Harrisburg, Pa.
Second Vice-President, DR. JAMES ROBERTS, Hamilton, Ont.
Third Vice-President, DR. J. E. MONJARAS, Mexico, D. F., Mexico.
Secretary, PROF. SELSKAR M. GUNN, Boston, Mass.
Treasurer, DR. LIVINGSTON FARRAND, New York, N. Y.

Symposium on the Control and Improvement of Food Supplies.

The Function of Federal Authorities. Dr. Carl Alsberg, Bureau of Chemistry, Department of Agriculture, Washington, D. C.

The Function of State Authorities. Mr. H. E. Barnard, State Board of Health, Indianapolis, Ind.

The Function of Municipal Authorities. Dr. Ernst J. Lederle, Commissioner of Health, New York City.

PRESIDENT RUDOLPH HERING, D. Sc.

The Function of Voluntary Organizations. Mr. Bailey B. Burritt, Department of Social Welfare, A. I. C. P., New York City.

The Role of Controlled and Guaranteed Advertising. Mr. Richard H. Waldo, Good Housekeeping Magazine, New York City.

The Reappearance of the Ghost of Malthus. Professor William T. Sedgwick, Massachusetts Institute of Technology, Boston, Mass.

Self Imposed Supervision by Organized Industries. Dr. H. D. Pease, New York City.

Transportation of Food Products: A Pressing Health Problem. Dr. Peter H. Bryce, Department of Immigration, Ottawa, Canada.

Public Health Aspects of the Candy Industry. Professor Samuel C. Prescott, Massachusetts Institute of Technology, Boston, Mass.

Industrial Lead Poisoning. Dr. Alice Hamilton, Hull House, Chicago, Ill.

Occupational Diseases and Legislative Remedies. Dr. John B. Andrews, American Association for Labor Legislation, New York City.

Industrial Hygiene, A Neglected Field of Public Health. Dr. C. T. Graham-Rogers, State Department of Factory Inspection, New York City.

Good Illumination, An Important Factor in Public Health and Safety. Mr. Clare N. Stannard, Denver, Colo.

The Venereal Problem. Dr. J. H. Landis, Health Officer, Cincinnati, Ohio.

The Health Department and the Control of Venereal Diseases. Dr. R. L. Dixon, Secretary, State Board of Health, Lansing, Mich.

Hindrances to the Extension of Uniform Methods for Vital Statistics in the United States. Dr. Cressy L. Wilbur, Bureau of the Census, Washington, D. C.

The Mortality from Cancer in the United States and Foreign Countries. Mr. F. L. Hoffman, Prudential Insurance Company, Newark, N. J.

Why are Modern Infectious Diseases Mild? Dr. H. W. Hill, Director, Institute of Public Health, London, Ont.

The Public Health Nurse. Dr. Guy L. Kiefer, Health Officer, Detroit, Mich.

Co-operation and Efficiency in Rural Health Work. Mr. John Ritchie, Jr., Massachusetts Institute of Technology, Boston, Mass.

Modern Methods of Fly Fighting. Dr. E. C. Levy, Chief Health Officer, Richmond, Va.

The Present Status of Pasteurization. Mr. S. H. Ayers, Bureau of Animal Industry, Washington, D. C.

The Future of Milk Industry. Dr. Francis E. Fronczak, Health Officer, Buffalo, N. Y.

An Investigation into the Relationship of Indoor Temperature and Humidity in the Winter to Infant Mortality from Respiratory Diseases. Dr. Donald B. Armstrong, Department of Social Welfare, A. I. C. P., New York City.

Infant Blindness and the Midwife Problem. Miss C. C. VanBlarcom, New York Association for the Blind, New York.

Yellow Fever in Mexico. Dr. Eduardo Liceaga, Superior Board of Health, Mexico City, Mex.

Cremation vs. Earth Burial, from a Sanitary Standpoint. Dr. E. A. Carr, State Board of Health, Lincoln, Neb.

Relationship of Public Health Work to Race Degeneracy. Dr. J. A. Kellogg, Battle Creek, Mich.

Public Health Administration, as a Layman Views It. Dr. George H. Heald, Washington, D. C.

Sanitation in Cuba: Its Progress. Dr. Jorge LeRoy, Havana, Cuba.

Practical Points in Railway Sanitation. Dr. A. E. Campbell, Health Officer, Illinois Central R. R., Chicago, Ill.

This list is still incomplete as several other important contributions have been promised but exact titles have not been received in time to include in the preliminary announcement.

All communications with regard to the program for the General Sessions should be addressed to the Secretary, Selskar M. Gunn, 755 Boylston Street, Boston, Mass.

PRELIMINARY PROGRAM OF THE LABORATORY SECTION

Chairman, Prof. F. P. Gorham,
Providence, R. I.
Vice-Chairman, Prof. Edward Bartow,
Urbana, Ill.
Recorder, Dr. A. W. Freeman,
Richmond, Va.
Secretary, Dr. D. L. Harris,
St. Louis, Mo.

Observations on the Incubation time for Diphtheria Cultures for Diagnosis. Henry Albert, Professor of Pathology and Bacteriology, University of Iowa, Iowa City.

The Antirabic Service of the Hygienic Laboratory for the Past Five Years. J. F. Anderson, Director Hygienic Laboratory, Washington, D. C.

The Value of Routine Water Analyses in Sanitary Surveys. H. E. Barnard, State Food and Drug Commissioner, Indianapolis, Indiana.

Condition of Wash Water. L. A. Fritze, Filtration Plant, Moline, Illinois

Upon the Determination of Minute Quantities of Nitrates Particularly in Potable Waters. A. H. Gill, Mass. Institute of Technology, Boston.

(1) Further Experiments on Antirabic Immunization. (2) Effect of Temperature and Light upon Vacuum Dried Bacteria. (3) Report of an Outbreak of Diphtheria. D. L. Harris, St. Louis, Missouri.

A Protest Against the 37°C. Standard of Agar for Use in Water Analysis. H. W. Hill, London, Ontario.

A Serious Fallacy of the Standard Methyline Blue Putrescibility Test. Arthur Lederer, Sanitary District of Chicago.

Methods for Examination of Clarifier Milk Slime. Charles E. North, 30 Church St., New York City.

Study of the Swimming Pool with a Return Purification System. John F. Norton, Massachusetts Institute of Technology, Boston.

Rational Basis for the Sanitation of Rivers and Harbors. George A. Soper, Metropolitan Sewerage Commission, New York City.

Some Comparisons Between the 20° and 37° Plate Counts for Enumerating Bacteria in Water. J. Bosley Thomas and Edgar A. Sandman, Water Department, Baltimore, Md.

The Effect of Renovation of Butter Upon the Reichert Meissl Number and Saponification Value. F. O. Tonney and F. W. Stockton, Department of Health, Chicago, Illinois.

Report of Committee on Standard Methods for the Preparation of Tuberculin Mallein. A. Parker Hitchens, Glenolden, Pa.

(1) Concerning Complement Splitting. (2) Further Studies Upon the Effect of Single and Mixed Typhoid Vaccines Upon Agglutinin Formation in Rabbits. A. Parker Hitchens and George Hansen, Glenolden, Pa.

The Counting of Bacteria on Surfaces. Adolph Gehrmann, Bacteriologist, The Columbus Laboratories, Chicago, Illinois.

Bacteriological Methods for Meat Analysis. John Weinzirl and E. B. Newton, University of Washington, Seattle.

The Number of Bacteria in Hamburger Steak. John Weinzirl and E. B. Newton.

A Rapid Method for the Bacteriological Determination of Manural Pollution in Milk. John Weinzirl and Milton V. Velder.

The Destruction of Bacterial Spores by Sunlight. John Weinzirl.

Papers have also been promised from W. Dreyfus, F. P. Gorham, H. C. Hamilton and others.

All communications from members with regard to the program for this section should be addressed to the Chairman of the Program Committee, Prof. Edward Bartow, University of Illinois, Urbana, Ill.

PRELIMINARY PROGRAM OF THE SECTION ON VITAL STATISTICS

Chairman, Dr. W. S. Rankin,
Raleigh, N. C.
Vice-Chairman, Dr. J. E. Monjaras,
Mexico, D. F., Mexico.
Secretary, Mr. David S. South,
Trenton, N. J.

1. Introductory Remarks by the Chairman. Dr. W. S. Rankin, Raleigh, N. C.
2. Election of Nominating Committee.
3. Nomination of New Members by the Committee on Membership. Dr. E. Arthur Carr, Chairman, Lincoln, Neb.
4. The Report of the Committee on Classification of Non-Resident Deaths. Prof. Walter F. Wilcox, Chairman, Cornell University, Ithaca, N. Y.
5. Report of Committee on Statistical Methods in Regard to Occupational Mortality. Dr. William F. Snow, Chairman, Sacramento, Cal.
6. Report of the Committee on the Subject of Defining, Registering, Recording, and Tabulating Stillbirths. Dr. Charles V. Chapin, Chairman, Providence, R. I.
7. Report of Committee on Forms and Methods of Statistical Practice and Tables. Prof. Walter F. Wilcox, Chairman, Cornell University, Ithaca, N. Y.
8. Report of Committee on Legislation. Dr. William C. Woodward, Chairman, Health Department, Washington, D. C.
9. Report of the Committee on Resolutions. Dr. William H. Guilfoy Chairman, Health Department, New York City.
10. Corrected Death Rates. Dr. Cressy L. Wilbur, Bureau of the Census, Washington, D. C.
11. The Popularization of Vital Statistics. Dr. William A. Evans, Chicago, Ill.
12. Uniformity in the Annual Reports of Local Boards of Health. Mr. Frederick L. Hoffman, Prudential Insurance Company, Newark, N. J.
13. Institutional Statistics, Possible Values and Methods of Collection. Dr. Charles F. Bolduan, Health Department, New York City.
14. Method of Collection and Value of Morbidity Statistics. Assistant Surgeon General J. W. Kerr, United States Public Health Service, Washington, D. C.
15. A Statistical Study of Measles. Mr. Frederick Crum, Prudential Insurance Company, Newark, N. J.

16. Methods for Securing Accuracy in the Registration of Causes of Death. Dr. Wilmer R. Batt, Department of Health, Harrisburg, Pa.
17. A Statistical Study of Infant Mortality. Mr. Edward Bunnell Phelps, Editor, American Underwriter, New York City.
18. Possibilities of Official Interference with the Mortality of the Higher Age Groups. Dr. Lee K. Frankel, Metropolitan Life Insurance Company, New York City.

There will be a joint session with the Section of Public Health Officials,

All communications from members with regard to the program for this section should be addressed to the Chairman of the Section, Dr. W. S. Rankin, State Board of Health, Raleigh, N. C.

PRELIMINARY PROGRAM OF THE SECTION OF PUBLIC HEALTH OFFICIALS

Chairman, Dr. P. M. Hall,
Minneapolis, Minn.
Vice-Chairman, Dr. John H. Landis,
Cincinnati, Ohio.
Secretary, Dr. E. C. Levy,
Richmond, Va.
Recorder, Dr. A. S. Fell,
Trenton, N. J.

Modern Health Administration; An Analysis. Oscar Dowling, M. D., President Louisiana State Board of Health.

The Value of the Laboratory as an Aid in the Diagnosis of Infectious Diseases. Guy L. Kiefer, M. D., D. P. H., Health Officer, Detroit, Mich.

(1) The Infectious Diseases of Eight Thousand Children. (2) The Non-Identity of Biblical and Modern Leprosy. (An original study.) H. W. Hill, M. D., D. P. H., Institute of Public Health, London, Ontario.

The Hospital Treatment of Infectious Diseases in the Municipality. George W. Goler, M. D., Health Officer, Rochester, N. Y.

How Can We Best Control Our Milk Supply? Charles J. Hastings, M. D., M. O. H., Toronto, Canada.

Methods of Determining the Source of an Epidemic of Typhoid Fever. Joseph S. Neff, M. D., Department of Public Health and Charities, Philadelphia, Pa.

Vital Statistics in Some Municipal Reports. Cressy L. Wilbur, M. D., Chief Statistician, Bureau of the Census, Washington, D. C.

Drug Habitués and Their Bearing upon the Public Health and Welfare. Charles E. Terry, M. D., Health Officer, Jacksonville, Florida.

The Routine of Medical Inspection of Schools in Boston. W. J. Gallivan, M. D., Chief, Division of Child Hygiene, Boston Health Department, Boston, Mass.

Control of Communicable Diseases. Powhatan S. Schenck, M. D., Health Commissioner, Norfolk, Va.

Publicity: Some Observations on Its Uses and Misuses. J. Scott MacNutt, Orange, N. J.

There will be a joint session with the Section on Vital Statistics.

Other important papers are also promised.

COMMITTEE REPORTS

The following committees have already signified their intention of presenting reports:

Committee on Foods, including Milk and Water. Charles J. Hastings, M. D., M. O. H., Toronto, Canada, Chairman.

Committee on Study and Prevention of Communicable Diseases. Francis George Curtis, M. D., Chairman, Board of Health, Newton, Mass., Chairman. This report will be on the detection and control of diphtheria carriers.

Committee on Industrial Hygiene and Sanitation of the Home. J. H. Landis, M. D., Health Officer, Cincinnati, Chairman.

It is expected that other committees will also make reports.

All communications from members with regard to the program for this section should be addressed to the Chairman of the Program Committee, Dr. J. H. Landis, Health Officer, Cincinnati, Ohio.

PRELIMINARY PROGRAM OF THE SANITARY ENGINEERING SECTION

Chairman, Col. J. L. Ludlow,
Winston-Salem, N. C.
Vice-Chairman, Mr. R. S. Weston,
Boston, Mass.
Secretary, Dr. H. D. Pease,
New York, N. Y.
Recorder, Prof. G. C. Whipple,
Cambridge, Mass.

In the Sanitary Section the time allotted will be devoted chiefly to reports and papers presented by members of the committees on Air Supplies, Water Supplies, Sewage Collection and Disposal, Refuse Collection and Disposal, River Cleaning and Street Cleaning, respectively.

The Committee on Air Supplies, of which Prof. William T. Sedgwick of the Massachusetts Institute of Technology is chairman, has arranged for papers as follows:

Some Fundamental Physical Factors in the Problem of the Control of the Atmospheric Environment. Professor E. B. Phelps, Boston, Mass.

Factory Ventilation in New York State. Dr. C. T. Graham-Rogers, New York City.

School Ventilation in New York City. Professor C.-E. A. Winslow, New York City.

An Experiment with Ozone in School-room Ventilation. Professor F. H. Bass, Minneapolis, Minn.

Some Preliminary Studies in Air Washing and its Results. Professor G. C. Whipple and Mr. M. C. Whipple, Cambridge, Mass.

Investigations on Ventilation. Mr. D. D. Kimball, New York City.

The Committee on Water Supplies, of which Mr. George W. Fuller is chairman, has prepared a very valuable report on the Status of Water Purification, and the following gentlemen have been asked to take part in the discussion of certain timely topics, as follows:

Hygienic Aspects. Dr. Dowling, Louisiana State Board of Health, and Dr. Levy, Richmond, Va.

Sterilization. Mr. H. W. Clark, Boston, Mass., and George A. Johnson, New York City.

Economies of Over-dosing of Coagulants. Mr. E. E. Lochridge, Springfield, Mass.

Water Softening and Decolorization. Mr. W. A. Sperry, Grand Rapids, Mich.

Corrosion of Metals. Prof. W. H. Monfort, St. Louis, Mo., and Dr. Frank E. Hale, Mount Prospect Laboratory, Brooklyn, N. Y.

The Committee on Sewage Collection and Disposal, of which Mr. G. S. Webster, chief engineer of the Bureau of Surveys, of Philadelphia, is chairman, will present a series of papers on some important aspect of the subject.

The Committee of Refuse Disposal, of which Mr. Samuel A. Greeley, consulting engineer, is chairman, is collecting statistics regarding municipal refuse disposal, for presentation at the meeting. Besides this, papers will be presented: (1) "How Shall Public Officials Proceed to Secure the Most Permanent and Satisfactory Improvement of their Local Refuse Collection and Disposal Problem?" (2) "What is Your Experience as to the Best Methods of Refuse Collection as Regards Equipment, Operation and Organization?"

There will also be a paper by Col. Morse on "Refuse Collection."

The Committee on River Cleaning, of which Prof. G. C. Whipple of Harvard University is chairman, will present a report, and is arranging a symposium on state control of stream pollution to be participated in by engineers of State Departments of Health.

The Committee on Street Cleaning, of which Mr. Samuel Whinery, consulting engineer, is chairman, has arranged for the following papers:

The Recoverable Values of City Refuse. Mr. George H. Norton.
Advantages and Disadvantages of Night Collection. Mr. Wm. H. Edwards.
Advantages and Disadvantages of Disposing of the Different Kinds of Refuse by Contract or Permanently Employed City Labor. Mr. R. C. Harris.
Municipal versus Contract Street Cleaning in Washington, D. C., and Analyses of Cost-keeping as applied to Municipal Management of Street Cleaning. Two papers. Mr. J. W. Paxton.
Recent Progress in Methods and Character of Street Cleaning. Mr. S. Whinery.

In addition to the papers secured by the Committees, there will be several other papers on miscellaneous sanitary engineering subjects. There will be one on the "Prevention of Mosquito Breeding in Storm-water Catch-basins" by Mr. Edwin S. Kastenhuber, Jr., of Vineland, N. J.

All communications from members with regard to the program of this section should be addressed to the Chairman of the Program Committee, Mr. Robert S. Weston, 14 Beacon Street, Boston, Mass.

PROGRAM OF THE SOCIOLOGICAL SECTION

Chairman, Mr. Homer Folks,
New York City.
Vice-Chairman, Dr. H. E. Dearholt,
Milwaukee, Wis.
Secretary, Mr. S. Poulterer Morris,
Denver, Colo.

First Session

General Topic

Sociological Aspects of Recent Reorganizations of Health Departments.

1. Cleveland, Ohio. Dr. R. H. Bishop, Jr., Secretary, Anti-Tuberculosis League of Cleveland, Ohio,
2. Minneapolis, Minn. Mr. Frederic Bass, Director of Laboratory, Minnesota State Board of Health, Minneapolis, Minn.
3. New York State Health Department. Mr. John A. Kingsbury, Assistant Secretary of State Public Health Commission, New York City.

SECOND SESSION

General Topic

Securing Funds for Public Health Work.

1. From Public Authorities on the Theory of Representative Government. Mr. Lawrence Veiller, Director of the Department for Improving Social Conditions, Charity Organization Society, New York City.
2. From Public Authorities by Referendum.
   (a) For the Cook County Tuberculosis Hospital. Mr. Frank E. Wing, General Superintendent, Municipal Tuberculosis Sanitarium, Chicago, Ill.
   (b) For the Seattle Tuberculosis Hospital. Dr. John Weinzirl, Bacteriologist, University of Washington, Seattle, Wash.
   (c) For the St. Lawrence (N. Y.) County Hospital. Mr. George J. Nelbach, Assistant Secretary, Tuberculosis Committee, State Charities Aid Association, New York City.
   (d) For the Winnebago County Tuberculosis Hospital. Mr. Otto F. Bradley, Assistant Secretary, Wisconsin Anti-Tuberculosis Association, Milwaukee, Wis.
3. From Private Sources.
   (a) Private Funds for Public Health. Mr. John M. Glenn, Director, Russell Sage Foundation, New York City.
   (b) The Anderson Memorial. Mr. Albert G. Milbank, Vice-President, New York Association for Improving the Condition of the Poor, New York City.

THIRD SESSION

General Topic

Some Economic Aspects of Health.

1. Health and Charity. Prof. Selskar M. Gunn, Massachusetts Institute of Technology, Boston.
2. Insurance Companies and Public Health Activities. Dr. Lee K. Frankel, Metropolitan Life Insurance Company, New York City.
3. Importance of Securing Adequate Remuneration for Physicians in Health, Dispensary and Hospital Work. Dr. Charles P. Emerson of Indianapolis, Ind.
4. Newer Aspects of Public Health Education. Dr. H. S. Dearholt, University of Wisconsin, Milwaukee, Wis.

In preparing the above program of the sociological section it has been deemed more important to have the papers written by those with special qualifications and knowledge, than to insist that those announced should agree to read the papers in person. All the papers above mentioned are

definitely promised, but in some instances they will be read by other persons than the writers.

All communications from members with regard to the program for this section should be addressed to the Chairman of the Section, Mr. Homer Folks, 104 East 22d Street, New York City.

ENTERTAINMENTS.

The Local Committee has been busily engaged in arranging a pleasant program of entertainments. The program as planned at the present time is as follows:—**September 9th, Reception and Smoker at the Chamber of Commerce Building; September 10th, Ball at Antlers Hotel; September 11th, Jungle Party and Barbecue at mouth of Cheyenne Canon; September 12th, Automobile Ride through the Garden of the Gods, Glen Eyrie and to the Modern Woodmen Sanatorium, where Doctor Rutledge, the Superintendent, will serve dinner.**

In addition to the above, the Local Committee are planning to arrange special entertainments for the ladies accompanying members.

COMMITTEE MEETINGS.

The Committee of Seven, the Executive Committee and Committee on Membership will meet on Monday, September 8th. The members of these various Committees will receive due notice with regard to the hours and place where these meetings will be held.

TRANSPORTATION.

On account of the relatively small number of members and the fact that they come from all sections of the country, it is impossible to get special concessions from the railroads (with the exception of the Trans-continental Passenger Association.) However, summer excursion rates which are now in effect make travel to Colorado very reasonable. The agents in your city will be able to give you full information with regard to rates, accommodations, etc.

TRANS-CONTINENTAL PASSENGER ASSOCIATION.

The trans-continental lines have individually announced special fares from California and North Pacific Coast Points for conventions and meetings. Tickets will be sold from North Pacific Coast Points daily up to September 30th and from California Points August 20, 21, 22, 26, 27, and 28, September 2, 3, 4, 5, 8, 9, 10, and 11. Fares to Colorado Springs via direct routes from California common points and North Pacific Coast

HOTEL ACCOMMODATIONS

Name of Hotel	No. of Rooms	*European Plan*				*American Plan*			
		Single Room without Bath	Single Room with Bath	Double Room without Bath	Double Room with Bath	Single Room without Bath	Single Room with Bath	Double Room without Bath	Double Room with Bath
COLORADO SPRINGS									
Acacia	140	$1.50–$2.00	$2.50–$3.00	$2.50–$3.00	$4.00–$6.00		European Only		
Alta Vista	100	1.00– 1.50	1.50– 2.50	2.00– 2.50	3.00– 4.00				
Antlers	250	1.50– 2.00	3.00– 3.50	3.00– 4.00	5.00– 6.00		European Only		
Elk	50	1.00 and up	1.50 and up	1.50 and up	2.50 and up		European Only		
Joyce	50	1.00– 1.50	2.00– 2.50	2.00– 2.50	3.00– 4.00		European Only		
Plaza	120	1.00– 1.50	2.00– 2.50	1.50– 2.50	3.00– 3.50		European Only		
Rex	60	1.00		1.50					
Spaulding House	50	.75– 1.00		1.00– 2.00					
MANITOU									
Cliff House	200	American Only				$3.00	$4.00–$6.00	$6.00	$8.00–$12.00
Grand View	110	$1.00–$1.50	$2.00–$3.00	$2.00–$3.00	$3.50–$4.00	2.50–$3.00	4.00– 5.00	5.00–$6.00	7.00– 8.00
Sunnyside	50	American Only				2.00			
Navajo	100	1.00	2.00	3.00	4.00	2.00	3.50	5.00	6.00

Points are $55.00. Going travel must commence on date of sale. Going transit limit is 15 days from date of sale and final return limit is October 31. Members are advised to consult with their agents for information concerning stop-overs, diverse routes, etc.

NEW MEMBERS.

Have you used that blank application form which has been sent you? Many already have as the Secretary is receiving daily new applications. **Don't forget that under the new ruling of the Constitution any person interested in public health work is now eligible to membership provided he has the proper endorsements.** Our Association should be the largest as well as the most important organization of its kind in the four countries. In order that this may be possible we must have the co-operation of our members. It should be relatively easy to interest some person in the Association. Won't you make a special effort to induce some eligible friend or acquaintance to join?

IN CONCLUSION.

Some few weeks ago the Secretary sent to each member a post card on which was requested that they indicate whether or not they were planning to be present at the Colorado Springs meetings. The response has been very satisfactory so far and it is assured that the Colorado Springs meetings will be well attended. A considerable number of members have so far failed to return their cards and they are requested to do so without delay. It can be readily understood that it is very important that the Local Committee be notified of the approximate number of members who are planning to be present, so that they may make their necessary arrangements. After you have read this Preliminary Announcement we feel sure that you will be anxious to come to Colorado if it is at all possible. Even if you have notified the Secretary to the effect that you are not planning to be present can't you reconsider and write to the Secretary stating that you will come?

MINUTES OF THE FORTIETH ANNUAL MEETING OF THE AMERICAN PUBLIC HEALTH ASSOCIATION.

Washington, D. C., September 18–20, 1912.

First Session.

The fortieth annual meeting of the Association was called to order in the New Willard Hotel, Washington, D. C., September 18, 1912. The President, Doctor J. N. Hurty in the Chair and 350 members present.

The minutes of the preceding meeting having been published in the Journal of the Association, reading was, by unanimous consent, dispensed with.

The report of the Committee on Membership, duly approved by the Executive Committee, was then presented recommending certain individuals for membership in the Association. It was moved that the Secretary cast the ballot of the Association for the applicants recommended. Carried unanimously.

The Secretary then cast the ballot in accordance with the instructions of the Association. (Complete list of all members elected will be found on page 820).

The Secretary announced the following resignations had been received during the past year:

Dr. George McIntyre, Dr. George C. Wellner, Mr. Charles L. Parmalee, Rev. J. T. Martin, Dr. Laban Dennis, Dr. Albert M. Mueller, Mr. Edwin N. Ezekiel, Dr. John E. Meany, Dr. W. S. Disbrow, Dr. H. T. Marshall, Dr. Thomas Dawson, Mr. Boyden Sims, Dr. John M. Armstrong, Dr. George O. Murray, Dr. John W. Ross, Mr. Wm. E. Taylor, Dr. J. G. Rutherford, Lieut. Col. Dudley A. Mills, Dr. H. M. Bracken and Dr. C. H. Hughes.

Moved and seconded that these resignations be accepted. Carried.

The Secretary also reported the following deaths since the last meeting:

Mr. David S. Merritt, Dr. Q. O. Sutherland, Dr. S. E. Chaille, Dr. James A. Burroughs, Dr. J. C. Cameron, Dr. A. N. Bell and Dr. C. J. Burke.

On motion the meeting then adjourned.

SELSKAR M. GUNN,
Secretary.

J. N. HURTY,
President.

Second Session.

The meeting was called to order at 2.15 p.m., September 18, by the President.

Papers were then read as follows:

Health Work Progress in America, by Dr. Francis E. Fronczak, Health Commissioner, Buffalo, N. Y.

What State Control Over Streams Has Done in Pennsylvania in Seven Years, by Dr. Samuel Dixon, Commissioner, Department of Health of Pennsylvania, Harrisburg, Pa.

The Money Value of Human Life by Dr. C. V. Chapin, Superintendent of Health, Providence, R. I.

Method in Educational Hygiene, by Dr. Oscar Dowling, President, State Board of Health of Louisiana, New Orleans, La.

The Need for General Health Protective Surveys and Programs, by Mr. M. N. Baker, Editor Engineering News, New York, N. Y.

The Prolongation of Human Life, by Dr. Guy S. Kiefer, Health Officer, Detroit, Mich.

The Trend of Medico-Social Effort in Child Welfare Work, by Mr. Wilbur C. Phillips, New York, N. Y.

The National Health Insurance Act of England as a Factor in the Health Conservation Movement, by Dr. W. F. Snow, Secretary, State Board of Health, Sacramento, Cal.

Doctor William C. Woodward moved that in view of the fact that the Association of Agricultural Chemists was meeting in Washington, an Association which has to do largely with food and protecting it against adulteration, that the Secretary be instructed to invite the Association of Agricultural Chemists to attend the meetings of the American Public Health Association and to participate in the discussions. Motion was seconded and carried.

The meeting then adjourned.

SELSKAR M. GUNN, *Secretary.* J. N. HURTY, *President.*

Third Session.

The meeting was called to order at 8 o'clock, September 18, the president in the Chair.

The invocation was pronounced by Rev. James Shera Montgomery. The address of welcome was delivered by Doctor Harvey W. Wiley of Washington. The responses were made as follows:

For the United States, Doctor Henry D. Holton.

For the Dominion of Canada, Doctor Peter H. Bryce.

For the Republic of Mexico, Doctor Eduardo Liceaga.

For the Republic of Cuba, Doctor Federico Torralbas.

The President of the Association then delivered his annual address. The meeting then adjourned.

SELSKAR M. GUNN, *Secretary.* J. N. HURTY, *President.*

Fourth Session.

The meeting was called to order at 9 a.m., September 19, the President in the Chair.

On behalf of the Executive Committee the Secretary then submitted the

Report of the Treasurer duly audited and approved by the Committee of Seven as follows:

REPORT OF THE TREASURER AMERICAN PUBLIC HEALTH ASSOCIATION SEPTEMBER 1, 1912.

Receipts.

F. W. Wright, Former Treasurer	$1653.15
B. R. Rickards, Former Editor	274.96
Interest on checking account (Lincoln Trust Co.)	6.67
Henry D. Helton: Donation	500.00
Robert M. Simpson: Donation	500.00
Fund raised by Chairman of Committee on Journal	1500.00
Office Receipts, March 1 to September 1, 1912	
Dues to Association	486.00
Subscriptions to Journal	1086.50
Sales of Journal	66.89
Advertisements	1007.08
Sales of Water Analysis Report	508.00
Sales of Transactions	139.00
Miscellaneous Receipts, Refunds, etc	149.97
Refunds on Postage % for mailing magazines	70.94
	$7949.16

Disbursements.

For Journal:		
Salaries	$2169.50	
Salaries: 1911 account	79.65	
Printing	2294.05	
Printing: 1911 account	487.69	
Stationery	255.33	
Postage: General	339.36	
Postage and envelopes for mailing magazines	271.04	
Rent and Misc. office expenses	465.51	
Furniture	93.25	
Traveling expenses	76.25	
		$6531.63
For Association:		
Printing	$102.65	
Stationery	207.33	
Postage	88.74	
Incidentals	98.44	
Traveling Expenses: 1911 account	293.00	
Transactions	34.32	
Water Analysis Reports	66.05	
		890.53
Miscellaneous.		
Refunds, and disbursements for which reimbursements were made	154.53	
		7576.69
Balance on hand		$372.47

SPECIAL ACCOUNT

On Deposit in

Connecticut Savings Bank, New Haven	$1689.87	
National Savings Bank, New Haven	1148.56	
		2838.43
Total balance on hand		$3210.90

LIVINGSTON FARRAND,
Treasurer.

September 17, 1912, audited and approved
J. N. HURTY,
Chairman of the Committee of Seven.

It was moved and seconded that the Treasurer's Report be accepted and placed on file. Carried.

The Executive Committee submitted the Report of the Committee of Seven as follows:

REPORT OF THE COMMITTEE OF SEVEN AMERICAN PUBLIC HEALTH ASSOCIATION.

In compliance with Article 5, Section 4 of the Constitution the Committee of Seven respectfully submits the following report of motions passed since the Havana meeting.

"That Selskar M. Gunn be elected Secretary."

"That the resignation of Dr. Wright be accepted and that Dr. Livingston Farrand be elected Treasurer of the Association."

"That the Committee of Seven instruct the Treasurer to transfer to Dr. Henry D. Holton, the Chairman of the Committee on Trust Funds in July as soon as the interest on the funds is paid, the trust funds then held to the credit of the Association in the Connecticut Savings Bank and the National Savings Bank of New Haven."

"That the Committee on Journal is hereby authorized to draw upon the trust funds of the Association for such sums as may be necessary to successfully conduct the publication of the Journal of the Association, and the Treasurer is hereby authorized to acknowledge all drafts or demands upon the trust funds made by the Committee on Journal upon endorsement by the President and Secretary of the Committee of Seven."

"That the Treasurer, Dr. Livingston Farrand, be authorized to open a banking account in the name of the Association, to sign and endorse checks, and to transact all business in connection with such account."

"That the new Treasurer of the Association, Dr. Livingston Farrand, be instructed to take out a bond for $5,000.00 at once and if possible to continue the former Treasurer's bond, so that there may be no lapse of time when the Treasurer is without a bond."

"That Dr. J. H. Townsend of New Haven be appointed auditor of the accounts of the retiring treasurer, Dr. Frank W. Wright."

"That the annual meeting of the American Public Health Association be held on the three days commencing Wednesday, September 18 and ending Friday, September 20, 1912."

"That the bill of $100 of Dr. Wright for services rendered the Association as Treasurer be approved."

"That the Committee of Seven appoint the following gentlemen to act as a Committee to arrange for the proper representation of the American Public Health Association at the International Congress of Hygiene and Demography; to see what the Association can do and what the probable cost would be:

Dr. H. D. Pease of New York, Dr. H. W. Hill of Minneapolis, Dr. W. C. Woodward of Washington, Dr. W. F. Snow of California, Dr. G. T. Swarts of Providence."

The Committee also begs to state that since the Havana meeting one hundred new members of the Association have been elected as provided in Chapter 5 of the By-Laws as amended December 6, 1913.

J. N. Hurty,
Chairman.

It was moved that the Report of the Committee of Seven be received and placed on file. Seconded and carried.

The Executive Committee submitted the Report of the Committee on Journal as follows:

REPORT OF THE COMMITTEE ON JOURNAL.

To the Members of the Executive Committee,

Gentlemen:

In compliance with instructions contained in the reports on Journal adopted by the Executive Committee, and approved by the Association at Havana, your committee last December at once took steps to get in touch with some publishing concern and if possible to get it to take up the publication of the Journal of the Association. After several informal conferences by members of your Committee with Dr. Livingston Farrand, of the Journal of "Out Door Life," a meeting was held in New York on January 2, 1912, at which the proposition of Dr. Farrand contained in the attached memorandum was discussed and afterwards unanimously adopted by the Members of the Journal Committee either present or present by proxy. The Committee on Journal communicated the proposition and its resolution adopting the same to the Members of the Committee of Seven, and secured their approval of its action.

As was to be expected, some time was necessary to have completed the large amount of work belonging to the offices of the Secretary and Treasurer arising out of the Havana meeting and while Dr. Farrand as Editor-in-Chief, at once proceeded with the publication of the January number of the Journal, it was not till March 15, when the second meeting of the Journal Committee was held, that the organization of the editorial work of the Journal Committee was completed and Dr. Farrand became treasurer of the Association and Editor-in-Chief of the American Journal of Public Health with Prof. S. M. Gunn, Managing Editor and Dr. P. P. Jacobs, Business Manager.

The organization of an Editorial Staff with the offices of the Association in New York, having been affected the Committee has found it unnecessary to hold further meetings, different members finding it possible to be in New York from time to time, when they have found the work becoming each month better organized and a progressive business concern, whose exact status up to date is to be found in the statement of the Editor-in-Chief and Treasurer submitted herewith.

In view of the annual meetings having been in December 1911, and in September 1912, and owing to the fact that the organization of the editorial staff was not completed till March 15, 1912, only six months have been afforded your Journal Committee wherein to obtain results from the efforts made to establish a journal worthy of the Association. As the report of the Committee on Journal, adopted by the Association at Milwaukee, September, 1912, is the basis upon which the work of your Committee of this year has been carried on it has assumed that the period for which its arrangements with the Editor-in-Chief, and his staff were made, is for a year, rather than for the time between one annual meeting and another. Your Committee has therefore made the payment of salaries by months on the basis of the

agreement adopted at the meeting in January last. This arrangement is being continued as all the Journal staff have consented to continue in their positions for this year. Your Committee on Journal would however, recommend that the calendar year be the period for which it is authorized to make its arrangements with the Editor-in-Chief, and his staff.

Your Committee in completing this its first report, rather than complimenting itself, prefers to have the work of the editorial staff measured by their success even in six months, in establishing a Journal intended to express, and as a matter of fact illustrating the best ideals of scientific journalism, an organ, the exponent of the best public health work and practice and a publication worthy of the confidence and support of the sanitarian of the four countries represented in the American Public Health Association. Your Committee desires further to express the hope that the work of a committee, which has been marked by singular unanimity of opinion as to what the situation in the interest of the Association demanded and by the greatest harmony in cooperating with its staff to that end, be continued so that, as it firmly believes, the continuity of work and effort on its part and that of its editorial staff will by the end of another year find the Association the possessor of a self-sustaining Journal of the highest scientific and literary character.

The Committee on Journal,

(Signed) P. H. Bryce,
Secretary.

Henry D. Holton, *President.*

Washington, D. C.,
September 17, 1912.

It was moved that the report be accepted and that a vote of thanks be given to the Journal Committee for their very efficient work during the past year and further that the recommendations made in the report be adopted. Seconded and carried.

New members were elected.

Doctor G. Lloyd Magruder presented a resolution relating to definite standards and regulations for dairy products. On motion the resolution was referred to the Executive Committee. Doctor G. Lloyd Magruder then offered a second resolution relating to standard methods of dairy farm inspection which was also referred to the Executive Committee.

Papers were then read as follows:

Symposium on Cold Storage

Cold Storage and Public Health, by Professor William T. Sedgwick, Massachusetts Institute of Technology, Boston, Mass.

The Physics of Refrigeration as Applied to the Conservation of Food Products, by Dr. Peter H. Bryce, Superintendent of Immigration, Ottawa, Canada.

The Bacteriology of Fermentation and Putrefaction in Relation to the Conservation of Foods, by Professor Samuel C. Prescott, Massachusetts Institute of Technology, Boston, Mass.

The Hygienic and Economic Results of Refrigeration in the Conservation of Poultry and Eggs, by Dr. Mary E. Pennington, Chief of Food Research Laboratory, Bureau of Chemistry, U. S. Department of Agriculture, Philadelphia, Pa.

The Hygienic Results of Refrigeration in the Conservation of Fish and Mollusks, by Dr. Herbert D. Pease, Lederle Laboratories, New York City.

Cold Storage in Relation to the Food Supply, by Mr. Harry E. Barnard, State Food and Drug Commissioner, Indianapolis, Ind.

The Committee on Cold Storage then presented its report.

It was moved that the Report be referred to the Executive Committee. Motion seconded and carried.

The following papers were then read:

Methods used in Eradicating Hookworm Disease, by Dr. John A. Ferrell, Director Hookworm Commission, Raleigh, N. C.

Sewage Treatment versus Sewage Purification, by Professor George C. Whipple, Harvard University, Cambridge, Mass.

Seasonal Temperatures and Seasonal Diseases, by Dr. Charles E. North, Consulting Sanitarian, New York, N. Y.

Possible Dangers in Mineral Waters, by Dr. Julio F. Arteaga, Havana, Cuba.

Rules of Hygiene which should be observed in Hospitals and in Sanatoria, by Dr. Miguel Marquez, Chihuahua, Mexico. (Read by Title.)

The meeting then adjourned.

SELSKAR M. GUNN,
Secretary.

J. N. HURTY,
President.

Fifth Session.

The meeting was called to order at 8 p. m., September 19, the President in the Chair.

The Report of the Committee on the Control of Milk Supplies was presented. It was moved that the Report be referred to the Executive Committee. Seconded and carried.

The Committee on the Conservation of Infant Life made its report. It was moved that the Report be referred to the Executive Committee. Seconded and carried.

The following papers were then presented:

Some Newer Problems in the Anti-Tuberculosis Warfare in the United States, by Dr. S. Adolphus Knopf, New York, N. Y.

Educational Publicity in Offense and Defense, by Dr. Hoyt E. Dearholt, Executive Secretary, Wisconsin Anti-Tuberculosis Association.

The Prophylaxis of Bubonic Plague, by Dr. W. C. Rucker, Assistant Surgeon General, United States Public Health Service, Washington, D. C.

The Defense of the Mexican Republic Against the Possible Invasion of Bubonic Plague, by Dr. Eduardo Liceaga, President, Superior Board of Health, Mexico.

The Application of Vaccines in the Prevention of Plague, by Dr. W. H. Frost, Passed Assistant Surgeon, U. S. Public Health Service, Washington, D. C.

The Importance of Factors other than Feeding in the Control of Infantile Diarrhœa, by Dr. E. C. Levy, Chief Health Officer, Richmond, Va.

A Unique Organization of Milk Dealers, by Mr. F. D. Bell, Lederle Laboratories, New York, N. Y.

An Outbreak of Septic Sore Throat, by Dr. William Royal Stokes and Dr. F. W. Hachtel, Bureau of Bacteriology, State Department of Health, of Maryland, Baltimore, Md.

Institutional Vaccination, by Dr. J. N. Force, Assistant Professor of Epidemiology, University of California, Berkeley, Cal. (Read by title.)

The meeting then adjourned.

SELSKAR M. GUNN,
Secretary.

J. N. HURTY,
President.

Closing Session.

The meeting was called to order at 8 p. m., September 20, the President in the Chair.

The first thing on the program was the election of new members.

REPORT OF THE EXECUTIVE COMMITTEE.

In accordance with the notice of change in the Constitution made at Havana in 1911 by Dr. Bryce with the view to abolishing associate membership and making any person interested eligible to membership in the general association without any specified technical training, the Executive Committee recommends that the Constitution be so altered by the Committee of Seven in its reading so that the wording be made to conform thereto.

The Executive Committee recommends the adoption of the following resolution:

"Resolved, that the committees authorized at the last preceding meeting of the Association and not specifically discharged at this meeting be continued, and that the President be authorized to appoint such other committees as to him may seem proper."

The Executive Committee reports that Drs. Holton, Swarts, Bryce and Pease had been elected by the Executive Committee to serve on the Committee of Seven during the ensuing year and that the Journal Committee composed of Drs. Holton, Swarts and Bryce be continued as already approved of by vote of the Association.

The Executive Committee reports the election of Prof. C.-E. A. Winslow and Mr. Burt R. Rickards to serve on the Membership Committee as provided for in the Constitution.

In accordance with the notice of change in the Constitution made in Havana in 1911 by Dr. Levy, the Executive Committee recommends the following amendment to Article 5, Section 8 of the Constitution:

Add to the first paragraph the following: "Members of the Advisory Council representing States, provinces, territories, or districts shall be selected by the active members of the Association of each State, province, territory or district present at each meeting, and their selection shall be reported in writing to the Secretary. In event of the failure of any such delegation so to report, the Executive Committee shall nominate the representatives of such jurisdiction on the Advisory Council or authorize the President to do so."

J. N. Hurty,
Chairman.

It was moved that the Report be approved and made part of the Proceedings. The motion was seconded and carried.

It was moved that the resolutions contained in the report be adopted. The motion was seconded and carried.

REPORT OF ADVISORY COUNCIL.

The Advisory Council met on September 19 at 4.30 p. m. in the New Willard Hotel, Washington, D. C., and was called to order by the Secretary of the Association. Upon roll call, representatives responded as follows:

United States.

Army, Medical Department, Col. J. R. Kean; Bureau of the Census, Dr. Cressy L. Wilbur; Alabama, Dr. W. H. Sanders; California, Dr. Wm. F. Snow; Colorado, Dr. O. R. Gillett; Connecticut, Dr. Joseph H. Townsend; Delaware, Dr. A. E. Frantz; Florida, Dr. Joseph Y. Porter; Georgia, Dr. V. H. Bassett; Iowa, Dr. Henry Albert; Massachusetts, Prof.

James O. Jordan; Michigan, Dr. R. L. Dixon; Minnesota, Dr. R. H. Mullin; Missouri, Dr. D. L. Harris; Montana, Dr. T. D. Tuttle; Nebraska, Dr. E. A. Carr; New Jersey, Dr. A. C. Hunt; New York, Dr. E. H. Porter; North Carolina, Dr. W. S. Rankin; North Dakota, Dr. G. A. Ruediger; Ohio, Dr. C. A. Ford; Pennsylvania, Dr. W. R. Batt; Rhode Island, Dr. G. T. Swarts; Virginia, Dr. E. C. Levy; Washington, Dr. J. E. Crichton; Wisconsin, Prof. M. D. Ravenel; District of Columbia, Dr. W. C. Woodward; Canal Zone, Dr. A. J. Orenstein.

CANADA.

Immigration Service, Dr. P. H. Bryce; Alberta, Dr. T. H. Whitelaw; Manitoba, Dr. R. M. Simpson; Saskatchewan, Dr. W. J. McKay; Ontario, Dr. John A. Amyot.

MEXICO.

Superior Board of Health, Dr. E. Liceaga; Guanajuato, Dr. F. Valluenza; San Luis Potosi, Dr. J. E. Monjaras.

SECTIONS.

Laboratory, Dr. J. F. Anderson; Vital Statistics, Dr. W. H. Guilfoy; Municipal Health Officer, Dr. G. F. Goler; Sociological, Dr. L. Farrand; Sanitary Engineering, Dr. H. D. Pease.

The Council then organized by the election of Dr. J. H. Townsend, of Connecticut, as Chairman, and Dr. H. D. Pease, of New York, as Secretary.

Upon ballot, the Council nominated the members named below, each for the office stated immediately preceding his name:

For President, Rudolph Hering, D. Sc., of New York.

For First Vice-President, Dr. W. R. Batt, of Harrisburg, Pa.

For Second Vice-President, Dr. James Roberts, of Hamilton, Ont.

For Third Vice-President, Dr. J. E. Monjaras, of San Luis Potosi.

For Secretary, to fill the unexpired term of Dr. Woodward, which has been filled by Selskar M. Gunn by vote of the Committee of Seven since Dr. Woodward's resignation, Selskar M. Gunn.

For Treasurer, for two years, Dr. Livingston Farrand.

For Executive Committee, each to serve two years, Dr. J. Y. Porter, Dr. J. F. Anderson, Dr. W. G. McKay.

Invitations to meet in 1913 in each of the places named below were received:

Philadelphia, Atlantic City, St. Louis, Niagara Falls, New Orleans, Jacksonville, Colorado Springs, Canal Zone, Indianapolis, San Francisco, Kansas City, Chicago.

Upon ballot, the Council voted to recommend that the invitation of Colorado Springs be accepted.

The Council by ballot nominated the person named below for election as honorary member:

Dr. Jacques Bertillon, of Paris.

There being no further business, the Council then adjourned.

J. H. TOWNSEND,
Chairman.

H. D. PEASE,
Secretary.

It was moved that the Secretary be instructed to cast one ballot for all the names recommended in the Report. The motion was seconded and carried and the Secretary cast the ballot and declared the gentlemen elected.

It was moved that the recommendation of the Advisory Council with

regard to the 1913 place of meeting be accepted and that Colorado Springs be selected. The motion was seconded and carried.

The following papers were then presented:

The Importance of Negative Eugenics or the Prevention of Ill-bornness, by Dr. Woods Hutchinson, New York, N. Y.

Common Sense in Public Health Work, by Prof. William T. Sedgwick, Massachusetts Institute of Technology, Boston, Mass.

Economic Aspects of Hygiene in Factory Management, by Dr. Winthrop Talbot, Editor, Human Engineering, Cleveland, Ohio.

Mosquito Catching in Dwellings as an Anti-Malaria Measure, by Dr. A. J. Orenstein, Assistant Chief Sanitary Inspector, Isthmian Canal Commission, Ancon, C. Z.

Prevention of Insanity, by Mr. Homer Folks, Secretary, State Charities Aid Association, New York, N. Y.

Annual Report on Yellow Fever in the Republic of Mexico, by Dr. Eduardo Liceaga, President, Superior Board of Health, Mexico.

Typhoid Fever Prevention, by Dr. L. L. Lumsden, Past Assistant Surgeon, U. S. Public Health Service, Washington, D. C.

Rural Typhoid in Manitoba, by Dr. R. M. Simpson, Chairman Board of Health, Winnipeg, Canada.

The Yakima Sanitary Campaign, by Dr. Thomas Tetreau, Health Officer, North Yakima, Wash.

A Plea for a More Widespread Interest in the Investigation and Control of Typhoid Fever, by Dr. William C. Hanson, Assistant to the Secretary, State Board of Health of Massachusetts, Boston, Mass.

Typhoid Fever as Related to Rural Public Health Administration, by Dr. Charles F. Bolduan, Assistant to the General Medical Officer, Department of Health, New York, N. Y.

The following reports were received and ordered placed on file.

REPORT OF THE LABORATORY SECTION.

The Laboratory Section begs to announce the election of officers as follows:

Chairman, Professor F. P. Gorham.

Vice-Chairman, Professor Edward Bartow.

Recorder, Dr. A. W. Freeman.

Secretary, Dr. D. L. Harris.

Elected members of Council:

Dr. A. P. Hitchens, Dr. J. A. Amyot, Professor C. E. A. Winslow, Mr. C. P. Moat.

REPORT OF THE SECTION ON VITAL STATISTICS.

The Section on Vital Statistics begs to announce the election of officers as follows:

Chairman, Dr. W. S. Rankin.

Vice-Chairman, Dr. J. E. Monjaras.

Secretary, Mr. David S. South.

REPORT OF THE MUNICIPAL HEALTH OFFICERS SECTION.

The Section of Municipal Health Officers has elected the following officers for the ensuing year:

Chairman, Dr. P. M. Hall, Minneapolis,

Vice-Chairman, Dr. John H. Landis, Cincinnati,

Secretary, Dr. E. C. Levy, Richmond.
Recorder (held over from this year), Dr. A. S. Fell, Trenton.
Advisory Members of Section Council:
Dr. J. S. Neff, Philadelphia, Dr. James Roberts, Hamilton, Ont., Dr. Jesus Monjaras, Mexico City, Dr. A. G. Dominguez, Havana, Dr. C. E. Terry, Jacksonville.
Section Member of Advisory Council:
Dr. G. W. Goler, Rochester.

The Municipal Health Officers Section has, in accordance with the requirements of the Constitution of said Section, amended Sections 1 and 8 of its Constitution, to read as follows:

1. This organization shall be known as the American Public Health Association—Section of Public Health Officials.

8. There shall be but one class of membership, the active. National, State, Provincial, County, City, township and village health officials, or employees, who are members of the A. P. H. A. and who have been, or are, in active public health work, are alone eligible. The Section asks the approval of the Association as required by the Constitution.

The following resolution was proposed by Dr. Wm. C. Woodward and referred to the Section Council:

"Whereas the interests of the Municipal Health Officers' Section of the American Public Health Association and those of the Conference of State and Provincial Boards of Health are essentially identical;

"And whereas the members of the State and Provincial Boards of Health, to a large extent, attend the meetings of both organizations;

"And whereas the time and expense incident to attending annually two meetings, held at different dates and places is considerable;

"Therefore, Be it resolved that the Municipal Health Officers' Section of the American Public Health Association requests the Association to extend an invitation to the Conference of State and Provincial Boards of Health to affiliate with said Section."

The above was recommended by the Section Council, passed unanimously by the Section and forwarded to the Association for action.

The communication from Dr. F. Park Lewis, Chairman of the Committee on Prevention of Blindness of the American Medical Association, which was referred to the Municipal Health Officers' Section by the Executive Committee, was referred to a special committee of three Drs. Landis, Guyon, and Crichton, with instructions to report at the 1913 sessions.

The following resolution, made by Dr. Magruder, which was referred to the Municipal Health Officers' Section by the Executive Committee, was unanimously adopted by the Section:

"Whereas, it has been shown that valuable results have been obtained from the requirement for proper inspection of dairy farms and dairy depots before granting a permit for the production and distribution of milk and that the score card has been of great utility in recording the observations made at such inspections;

"Be it resolved that efforts be made to secure uniform standards for inspection and methods of recording the same."

E. C. Levy, *Secretary*,
M. H. O. Section.

It was moved that the various recommendations made in this report be adopted. Seconded and carried.

REPORT OF THE SANITARY ENGINEERING SECTION.

The Sanitary Engineering Section begs to announce the election of officers as follows:
Chairman, Col. J. L. Ludlow.
Vice-Chairman, Mr. R. S. Weston.

Secretary, Dr. H. D. Pease.
Recorder, Prof. G. C. Whipple.

Elected members of Council:

Mr. Rudolph Hering, Professor C. E. A. Winslow, Mr. Harrison P. Eddy, Mr. Morris Knowles, Mr. F. Herbert Snow.

REPORT OF THE SOCIOLOGICAL SECTION.

The Sociological Section begs to announce the election of officers as follows:

Chairman, Mr. Homer Folks.
Vice-Chairman, Dr. H. E. Dearholt.
Secretary, Mr. S. Poulterer Morris.

The following resolution was offered by Dr. Bryce, seconded and unanimously carried:

Resolved, that the thanks of the American Public Health Association be extended to the members of the Local Committee of Arangements for the conveniences and courtesies extended to the members; to the local press for their good reports of the papers and discussions and to the citizens and members of the medical profession for kindnesses extended to members and visiting delegates.

Moved by Doctor Lumsdea that a rising vote of thanks be extended to our distinguished President and our very able and efficient Secretary for the excellent administration they have given the Association during this most notable session. The motion was put by Dr. Lumsden and seconded by Professor Sedgwick and unanimously carried, whereupon the Association adjourned.

J. N. Hurty,
President.

Selskar M. Gunn,
Secretary.

NEW MEMBERS

Names of persons elected at the Washington meeting of the Association or in the interim from the Havana meeting by action of the Committee of Seven:

Anderson, John B., M.D. ..... Spokane, Wash.
Andrews, Charles James, M.D. ..... Norfolk, Va.
Ashford, Bailey Kelly (Major) M.D. ..... San Juan, Porto Rico
Ayres, S. H. ..... Washington, D. C.

Baker, Moses Nelson ..... Upper Montclair, N. J.
Baldwin, Frank Oscar ..... Richmond, Va.
Ball, Halsey Jay, M.D. ..... Cortland, N. Y.
Ball, Henry Bryant ..... Newark, N. J.
Barnard, Harry Everett ..... Indianapolis, Ind.
Bassett, Victor H., M.D. ..... Savannah, Ga.
Billings, Frederick Horatio ..... Lawrence, Kans.
Bishop, Robert H., Jr., M.D. ..... Cleveland, Ohio
Blue, Rupert, M.D. ..... Washington, D. C.
Boldnan, Charles Frederick, M.D. ..... New York City

Booker, Warren H.....Raleigh, N. C.
Boyd, James Van Wagner, M.D.....Springfield, Mass.
Bramley, Harry Eugene.....New York City
Braymer, Arthur A.....Seattle, Wash.
Brooks, James Emery.....Glen Ridge, N. J.
Brosius, Albert M.....Havana, Cuba
Brown, Claude P., M.D.....Philadelphia, Pa.
Brown, Peyton R., M.D.....West Point, Miss.
Bull, Irving C.....New York City
Burritt, Bailey B.....New York City
Buttles, Ernest Hiram, M.D.....Burlington, Vt.

Carpenter, Wm. Taggart.....Brooklyn, N. Y.
Cauchon, Noulan, C. E.....Ottawa, Canada
Chagnon, Charles E., M.D.....Arctic, R. I.
Chapin, R. C.....Beloit, Mich.
Chapman, Frank Tomes.....New York City
Clark, Frederick E., M.D.....Burlington, Vt.
Clark, J. A., M.D.....Havana, Cuba
Clinton, George, M.D.....Belleville, Ontario
Coulter, Lester M., M.D.....Toronto, Ontario
Coward, Francis Asbury, M.D.....Columbia, S. C.
Crichton, James Edward, M.D.....Seattle, Wash.
Crull, Eric A., M.D.....Ft. Wayne, Ind.
Crumbine, Samuel J., M.D.....Topeka, Kans.

Dalton, Charles Francis, M. D.....Burlington, Vt.
Datesman, George Elvin.....Philadelphia, Pa.
Deacon, William J. V.....Topeka, Kans.
Defoe-st, Robert Weeks.....New York City
DeGarmo (Mrs.), E. D.....Portland, Me.
De Pree, Con.....Holland, Mich.
Dixon, Robert Livingston, M.D.....Lansing, Mich.
Dodd, Walter Le Roy.....Detroit, Mich.
Doolittle, Roscoe Edward.....Washington, D. C.
Dowd, Wyllys E., Jr.....New York City
Dublin, Louis I., M.D.....New York City

Edwards, John, M.D.....Gloversville, N. Y.

Fahey, Edward W., M.D.....Duluth, Minn.
Fitzgerald, John Gerald, Prof.....Berkeley, Cal.
Fulton, John S., Jr.....Baltimore, Md.
Furbush, C. Lincoln, M.D.....Philadelphia, Pa.
Furstman, Jacob Milton, M.D.....LaCrosse, Wis.

Gallivan, William Joseph, M.D.....South Boston, Mass.
Gaub, John.....Washington, D. C.
Gay, Frederick Parker, Prof.....Berkeley, Cal.
George, W. E., M.D.....North Bay, Ontario
Gillett, Omer Rand, M.D.....Colorado Springs, Colo.

Goltman, Maxamillian, M.D. ..... Memphis, Tenn.
Goodell, John Milton ..... Upper Montclair, N. J.
Graham-Rogers, Charles T., M.D. ..... New York City
Greeley, Samuel Arnold ..... Winnetka, Ill.
Green, Frank Whitney ..... Passaic, N. J.
Gregory, John H. ..... New York City
Griffitts, Thos. H. D., M.D. ..... Springfield, Ill.
Gulick, Luther Halsey, M.D. ..... New York City

Hallenbeck, Orlando J., M.D. ..... Canandaigua, N. Y.
Hard, William ..... New York City
Harrison, Shelby M. ..... New York City
Harrison, Wm. S., M.D. ..... Toronto, Canada
Harvey, P. W. ..... Cleveland, Ohio
Herms, William Brodbeck ..... Berkeley, Cal.
Hibbard, Mary Eugenie (Miss) ..... Havana, Cuba
Hoffman, James David ..... Lincoln, Neb.
Howard, John R., Jr. ..... East Northfield, Mass.
Howard, Norman Joseph ..... Toronto, Ontario
Howe, William Augustus, M. D. ..... Phelps, N. Y.
Hudson, Jessie Blanche, M.D. ..... Iowa City, Iowa
Humphrey, Henry C. ..... New York City
Huntoon, Gardner A., M.D. ..... Des Moines, Iowa
Hutchinson, Woods, M.D. ..... New York City

Ihlder, John ..... New York City

Jacobs, Philip Peter, Ph.D. ..... New York City
Jenkins, James, Jr. ..... Brooklyn, N. Y.
Jones, Henry Neely ..... Brookline, Mass.

Kastenhuber, Edwin Gustav, Jr. ..... Vineland, N. J.
Keith, Simeon Curtis, Jr. ..... Brookline, Mass.
Kelley, Eugene Robert, M.D. ..... Seattle, Wash.
Kelley, Florence (Mrs.) ..... New York City
Kendrick, Arthur ..... Cambridge, Mass.
Kennedy, George Grant ..... Harrisburg, Pa.
Kilbourne, Chas. Herbert ..... New York City
Kimball, Dwight Deland ..... New York City
King, William F., M.D. ..... Indianapolis, Ind.
Kingsley, Sherman C. ..... Chicago, Ill.
Kligler, Israel Jacob ..... Bronx, N. Y.
Kneeland, George J. ..... New York City

Ladd, Edwin F. ..... Fargo, N. D.
Lafreniere, Theodore Joseph ..... Montreal, Canada
Laidlaw, W. C., M.D. ..... Edmonton, Alberta, Canada
Lappin, Richard Corcoran ..... Washington, D. C.
Larson, Alfred ..... Bismarck, N. D.
Lattimore, Alida ..... Rochester, N. Y.
Le Prince, Joseph Augustin, M.D. ..... Ancon, Canal Zone

Leslie, James Franklin, M.D. ..... Waterville, Wash.
Lord, (Mrs.) Frederick T. ..... Boston, Mass.

McClenahan, Daniel A. ..... Hamilton, Ontario, Canada
McCullough, John Wm. Scott, M.D. ..... Toronto, Ontario, Canada
McGlenen, Edward Webster ..... Boston, Mass.
McLaughlin, Allan J., M.D. ..... Washington, D. C.
McLean, Francis H. ..... New York City
McNally, Thomas J., M.D. ..... Toronto, Ontario, Canada
MacFarland, Charles Steadman, Rev ..... New York City
Magruder, George Lloyd, M.D. ..... Washington, D. C.
Mahoney, Francis Xavier, M.D. ..... Boston, Mass.
Mahoney, John Joseph, M.D. ..... Jamestown, N. Y.
Mark, Edgar N. ..... Bowling Green, Ky.
Massey, Mabel ..... Raleigh, N. C.
Meader, Fred Marlin ..... Syracuse, N. Y.
Mebus, Charles Fillmore ..... Philadelphia, Pa.
Menge, George Albert ..... Washington, D. C.
Menninger, Charles Fredric, M.D. ..... Topeka, Kans.
Miles, Rufus E. ..... Cincinnati, Ohio
Mohler, Bruce Monroe ..... Minneapolis, Minn.
Moloney, Paul J., M.D. ..... Cornwall, Ontario
Moriarta, Douglas Calhoun ..... Saratoga Springs, N. Y.
Morris, S. Poulterer ..... Denver, Colo.

Nasmitt, George Gallie ..... Toronto, Ontario
National Board of Y. M. C. A. of U. S. ..... New York City
Neill, Mather Humphrey, M.D. ..... Pittsfield, Mass.
Nelbach, George Joseph ..... New York City
Nickerson, Joseph F. ..... Chicago, Ill.
Nutting, Louis Blackstone ..... New York City
Norton, John Foote ..... Boston, Mass.

Ogden, Henry Neely ..... Ithaca, N. Y.
Orenstein, Alexander J., M.D. ..... Ancon, Canal Zone
Overton, Frank, M.D. ..... Patchogue, L. I.

Park, William E., M.D. ..... Rockford, Ill.
Paxton, James Wilson ..... Washington, D. C.
Pennington, Mary Engle, M.D. ..... Philadelphia, Pa.
Phillips, Albert William, M.D. ..... Derby, Conn.
Phillips, Asa Emery ..... Washington, D. C.
Phillips, Wilbur C. ..... Pomona, N. Y.
Pons, Louis J., M.D. ..... Roxbury, Conn.
Porter, F. B ..... Fort Worth, Tex.
Prentiss, (Mrs.) S. R ..... Bangor, Me.
Prest, Charles Samuel, M.D. ..... Waterford, N. Y.

Quinn, Martha P. ..... Philadelphia, Pa.

Race, Joseph ..... Toronto, Canada
Reinhardt, George Frederick ..... Berkeley, Cal.

Rex, Clarence R. ..... Toledo, Ohio
Ritchie, John, Jr. ..... Boston, Mass.
Roach, Walter William, A.M., M.D. ..... Philadelphia, Pa.
Romer, John Boyd ..... Chicago, Ill.
Routzahn, Evart Grant ..... New York City
Rush, Chas. Henderson, M.D. ..... Lincoln, Neb.

Sanders, Wm. Henry, M.D. ..... Montgomery, Ala.
Sandman, Edgar August ..... Relay, Md.
Schaefer, Arthur Charles, M.D. ..... Buffalo, N. Y.
Schroeder, May Catherine, M.D. ..... New York City
Scudder, Kate ..... Covington, Ky.
Seager, Henry Rogers ..... New York City
Shimer, Will, M.D. ..... Indianapolis, Ind.
Shirreff, William Taylor, M.D. ..... Ottawa, Ontario
Smith, Karl W., M.D. ..... Madison, Wis.
Smyth, Francis Robertson, M.D. ..... Bismarck, N. D.
Snow, Frank Herbert ..... Harrisburgh, Pa.
Stevenson, William Lowrie ..... Philadelphia, Pa.
Storey, Thomas Andrew ..... New York City
Streeter, Lilian Carpenter (Mrs. Frank S.) ..... Concord, N. H.

Talbot, Winthrop, M.D. ..... Cleveland, Ohio
Tetreau, Thomas, M.D. ..... North Yakima, Wash.
Tilley, Frank William ..... Washington, D. C.
Tucker, George Eugene, M.D. ..... Riverside, Cal.

Underwood, Arthur Whitman, M.D. ..... St. Augustine, Fla.

Van Buren, George Henry ..... Washington, D. C.

Wagner, Adolph ..... Newport News, Va.
Wald, Lillian D. ..... New York City
Walker, John T. Ainslie ..... New York City
Warren, Benj. S., M.D. ..... Washington, D. C.
Webber, Steven E., M.D. ..... Calais, Me.
Webster, George Smedley ..... Philadelphia, Pa.
Whinery, Samuel ..... New York City
White, Courtland Y., M.D. ..... Philadelphia, Pa.
Whittier, Frank N., M.D. ..... Brunswick, Me.
Wile, Ira Solomon, M.D. ..... New York City
Wilson, Wm. W., M.D. ..... Lincoln, Neb.
Wright, Adam Henry, M.D. ..... Toronto, Canada

Young, Calvin Todd ..... Plant City, Fla.
Young, Clifford Caudy ..... Lawrence, Kans.

HONORARY MEMBER.

Bertillon, Jacques, M.D. ..... Paris, France

BOOK REVIEWS

Causes of Death among Woman and Child Cotton-mill Operatives. *By Arthur Reed Perry, M.D., Government Printing Office, Washington, D. C., 1912.*

This report constitutes Vol. XIV of the larger report on the investigation recently made by the United States Bureau of Labor into the industrial, social, moral, educational and physical condition of woman and child workers in the United States. As the title indicates, this section of the general report is limited to an intensive study of the mortality of women and children employed in cotton-mills. Certain typical cities were selected for the investigation, namely, Fall River, Mass., Manchester, N. H., and Pawtucket, R. I., in the north, and, in the south, Augusta, Ga., Atlanta, Ga., and Raleigh, N. C. The data obtainable for the southern cities, however, proved to be so incomplete that the study was confined to the three New England cities. The mortality figures refer to the three years 1905, 1906 and 1907. The total number of deaths of female operatives in the three New England cities during the three-year period was 450, and comparison is made of this mortality with 3,074 deaths of female non-operatives, 423 deaths of male operatives, and 2,656 deaths of male non-operatives. The grand total of deaths considered in the investigation was, therefore, 6,603.

The conclusions reached by the author may be briefly summarized as follows:

(1) The effect of cotton-mill work upon health, as reflected in the death rate, differs widely between the sexes, the female death rate at ages 15–44 being 7.63 per 1,000 employed, against a rate of 5.74 for male operatives.

(2) Female cotton-mill operatives have a high general death rate from tuberculosis, the rate being more than twice that of female non-operatives. In some age groups the relative differences are even more unfavorable to the operatives.

(3) An examination of the different factors which might adversely affect the death rate, led the author to conclude that cotton-mill work is prejudicial to the health of females and "that the combination of operative work with matrimony is especially harmful, and that, while the general hazard of the female operative is greater than that of the non-operative, she is in more danger from tuberculosis."

(4) The investigation disclosed the fact that the official death records contained many and serious errors, particularly in reference to the occupations of the decedents, and to the causes of death. The author corrected the errors of the first class so far as that was possible, but all of the latter were accepted. He asserts that "the conclusions reached in the investigation, therefore, certainly understate the facts as to the death rates of female operatives, the mortality from tuberculosis, and the special hazard of married women."

The author of this report has apparently taken great pains to make his investigation in many particulars as thorough as the facts warrant. There are some features of the report, however, which do not appear to be above criticism. For illustration, the high mortality of the Irish is dilated upon as if this were a new discovery, but equally suggestive data were published in Part I, Vital Statistics, Twelfth Census, 1900. The method adopted of presenting the data for a three-year period and for a one-year period has not been conducive to clearness and apparently serves no useful purpose. It may also be objected that not enough emphasis has been placed upon the relative mortality among the different employments. In this particular the author might have improved his report by modeling it after the annual reports of the Medical Health Officer of Blackburn, England. Also, more emphasis might properly have been placed upon the sanitary conditions of the various classes of work rooms—card, spinning, spooler, slasher, weave, etc. Considerable attention is devoted to housing conditions but practically no information is presented to show the physical conditions within the cotton mills, such

as dust, temperature, humidity, etc., which together must have operated more or less powerfully to undermine the health of the operatives, if the comparative death rates presented in the report are to be accepted as substantially correct.

Criticism is also justifiable of the method adopted of discussing the mortality only at ages 15 to 44 and 10 and over. No emphasis whatever is placed upon the mortality in the age group, 10 to 14, and as little upon the mortality at ages 45 and over. The report is supposed to deal with the woman and *child* workers in cotton-mills and the reader will naturally expect to find some qualified analysis of the data relating to operatives of ages under fifteen, but he will be disappointed.

On the whole, this report must be accepted as a valuable contribution to our knowledge of the mortality of cotton-mill operatives in this country, and as an important addition to the American bibliography of occupational diseases and mortality.

Frederick S. Crum.

Chloride of Lime in Sanitation. *By Albert H. Hooker, Technical Director, Hooker Electrochemical Company, 224 pp. cloth, $3.00. John Wiley & Sons, New York, Chapman & Hall, Limited. London, 1913.*

The first part of this book is a practical working manual for those who use chloride of lime or calcium hypochlorite for purposes of disinfection. It describes the manufacture, chemical analysis and general properties of the commercial product. Its use as a water disinfectant is described historically and with careful attention to the technical detail.

A similar treatment is given to the subject of sewage disinfection with special reference to the sanitary conditions in New York Harbor. Some reference is also made to the use of hypochlorite in street sprinkling and also in surgery and general sanitation.

An extensive bibliography comprises two-thirds of the volume. All the more important articles are also abstracted, some of them at considerable length. This portion of the book is a most valuable contribution to this whole subject and the work has apparently been done with painstaking care, and with excellent and most commendable judgment. Altogether some 442 citations are given either by title or in abstract.

Earle B. Phelps,

Mass. Institute of Technology.

The Orientation of Buildings or Planning for Sunlight. *By William Atkinson, Fellow of the Boston Society of Architects, First Edition, 8 vo. xiii 139 pages, 74 figures, cloth, $2.00 net. John Wiley & Sons, New York, Chapman & Hall, Limited. London, 1912.*

This volume is a valuable contribution to that newer aspect of architecture which recognizes that matters of the health and comfort of the people, such as heating, ventilation and illumination, constitute fundamental factors in architectural design. The author starts with the axiom that "one of the first requisites for a healthy building is abundance of sunlight." He develops the astronomical problem in such a way that the laymen can at least appreciate the applications which he makes later. Upon this basis he builds an ingenious method of developing shadow diagrams from which he can finally show that with any given type of structure and with any stated orientation, definite portions of the immediate surroundings and of the side walls of the building will be in sunlight or in shadow for stated periods of time.

These shadow diagrams are later extended to the problem of interior illumination through windows and to the effect upon such illumination of adjacent buildings. The latter half of the book is devoted to the practical application of these matters with especial reference to the design and orientation of hospitals, to the laying out of streets and to the effect of high buildings upon them. An appendix contains abstracts from city building codes. *Earle B. Phelps,*

Mass. Institute of Technology.

School Janitors, Mothers and Health. *By Helen C. Putnam, A.B., M.D., of the Committee of the American Academy of Medicine on the Teaching of Hygiene. Easton, Pa.; American Academy of Medicine Press. pp. 201, cloth, $1.00 net, postage prepaid.*

This volume by Dr. Helen C. Putnam of Providence is made up in the main of three series of short articles which appeared month by month in the Child-Welfare Magazine between 1909 and 1912. The current of thought is therefore somewhat broken and there is occasional repetition. What is lost in this way is perhaps more than made up by the fact that the compact topical form, re-enforced by Dr. Putnam's breezy and effective style, makes the book an eminently readable one.

The first of the three principal sections chiefly deals with the maintenance of such home conditions as will promote the health of the child and enable it to pass successfully through the necessary strain of its school life. In connection with the opening of the fall term the author says "A mother can make no wiser plan for the coming nine months than to concentrate on preventing school fatigue in her own children; after them, in the children of the less fortunate, whose ill health reacts on her own." The air conditioning of the home is here discussed and it is pointed out that "the three objects, then, for mothers to work for at home are house air as free as possible from dust, never above 68° in temperature, and frequently renewed from out of doors." Bathing and the care of the teeth, feeding and the care of the bowels, exercise, rest and recreation are all effectively discussed in their more general aspects.

In the second and third series of essays more emphasis is laid on the points at which the woman's efforts for sanitation extend beyond the home to be made effective in the field of public life. "Motherhood itself drives women out of their private homes into combinations of efforts for better enforcement of better laws for the sake of the children. The mother who has done wisely for her own must, even still for the sake of her own, help other mothers' children." Civic cleanliness, the inauguration of systems of medical inspection and in particular the sanitation of the schoolhouse itself are all problems which demand attention of this kind. "There are few things more illogical —it would be a hugh joke if it were not so terribly tragic—than for a government of fathers to collect all sorts and conditions of children away from their mothers, in public buildings cared for by ordinary working men (rarely by women) without training in housekeeping or health methods." "There are other calls on the mothers of the nation as great, but none greater than this, to keep schoolhouses as wholesome as the best homes."

The selection, education and supervision of janitors who play so important a part in determining the conditions of school life are rightly emphasized in these sections and in the two short isolated essays which follow them. Construction of floors, methods of cleaning, lighting, fresh air, the dangers of the common drinking cup and the importance of clean toilets are all discussed with vigor and picturesqueness and almost always with a fair and reasonable emphasis. A few points here and there are exaggerated. The increasing incidence of tuberculosis during school life is spoken of as if it were a case of cause and effect instead of an incident of progressive exposure to infection, much more out of school than in. There is also perhaps, a little too much weight laid on dust throughout, although it is pointed out that its danger lies not in the transmission of disease germs but in the mechanical injury to the mucous membranes which it causes.

The space devoted by Dr. Putnam to environmental conditions, to dust and windows and streets somewhat unduly outweighs the treatment of those personal habits of cleanness which are the main factors in the prevention of communicable disease. As Dr. H. W. Hill has pithily remarked "The old sanitation was concerned with the environment, the new is concerned with the individual, and finds the sources of infectious disease in man himself rather than in his surroundings." Yet so far as the environmental conditions themselves are concerned the book is sound and helpful and so well presented for popular reading that it should do a real service to the cause of public health.

C.-E. A. Winslow.

HEALTH DEPARTMENT REPORTS AND NOTES.

TO STATE AND MUNICIPAL HEALTH OFFICERS.

This new division of the Journal is specially designed to be of use to active Health Officers of the countries represented in the American Public Health Association. It will be unable to serve its true function unless the Health Officers are willing to coöperate by sending to the Journal copies of their reports, bulletins, new ordinances and personal information which will be of general interest. Furthermore it would be distinctly desirable if communications on subjects of general interest are submitted for publication in this division of the Journal. The management will further welcome any suggestions from Health Officers for the improvement of this division. All communications should be addressed to Selskar M. Gunn, Managing Editor, American Journal of Public Health, 755 Boylston St., Boston, Mass.

REPORTS.

Portland, Oregon.

The report of the Health Department for the year ending December 31, 1912 is very short and is composed almost wholly of statistics. It is unusually well planned, the tables being carefully chosen and arranged so that the report serves very well to demonstrate the value of statistical reports when they are used with judgment.

Portland is a city of 256,000 people of which 50,000 have been added in the past two years. The death rate has fallen as the population has increased, decreasing from 10.78 in 1910 to the enviable figure of 8.59 in 1912. The birth rate, 15.55, shows an increase over 1911 but a decrease from the 19.+ of 1910. The infant mortality and particularly the mortality from diarrhœa and enteritis has shown a steady and quite marked decrease during the past few years. This is attributed to the improvement in the condition of the milk supply and reference to the tables of average scores for dairies, creameries and milk depots bears out the statement. In 1912, 73.8 per cent. of the samples of raw dairy milk examined showed a bacterial count of less than 100,000 and 26.1 per cent. fell below 10,000.

Mr. Wheeler calls attention to the necessity of an additional garbage incinerator and urges that grounds be purchased for the erection of city hospitals for contagious diseases. The report makes no mention of inspection of schools or of the sanitary inspection of dwellings, restaurants, markets, etc.

Wilmington, Delaware.

Dr. Adair, President of the Board of Health, presents the report of the Secretary for the year ending December 31, 1912. The report is well prepared and carefully arranged but seems to indicate inadequate appropriations and equipment and a lack of a sufficient number of men to handle the work of a city of 92,500 population. Among the chief recommendations made by Dr. Adair are: (1) A reorganizaton which will place the milk inspector, meat inspector and vaccine physicians under control of the Health Department and (2) the establishment of a city laboratory. These recommendations need no

comment except that they should have been carried out long before. Other suggestions which should make for improvement are the regulation and license of midwives, an increased appropriation for health work and the establishment of pure food inspection.

The Secretary of the Board is also Registrar of Vital Statistics and presents his report in good shape according to the Bertillon classification. In his report as secretary he indicates that the laws and ordinances are being enforced as far as the means permit and the death rate has shown a regular decrease since 1910, falling to 15.57 in 1912. Sanitary inspection of restaurants, bakeries, milk depots, moving-picture theaters, dwelling houses, and vacant lots and alleys is carried on and the orders of the board have been backed up by the arrest of several offenders. The abolishment of public drinking cups, the extension of medical inspection of schools, the erection of a municipal hospital and the introduction of a new system of garbage collection are urged as means of improving the sanitary condition of the city.

Augusta, Georgia.

The report of the Department of Public Health for the year ending November 30, 1912 is presented in a very readable, although in places a rather informal way by Dr. Murphey, the President of the Board and ex-officio Health Officer. While the report does not display Augusta in an altogether favorable light from the standpoint of public health, the causes of deficiencies are clearly stated and remedies outlined and urged.

The city has a population of 51,000 of which two-fifths are colored. The death rate for the whites was 14 per thousand and for the negroes 25.5 making a total rate of 18.6, an increase of 1.6 over 1911. The increase is explained by the addition to the city of a large section known as "the territory," populated wholly by negroes; without water and sewer connections, and in a very bad sanitary condition. "The territory" also bears the blame for an increased infantile mortality and a general lowering of the average sanitary condition of the city in all branches.

It is interesting to note that among the principal causes of death nephritis is placed first with 13 per cent. of the total and pneumonia second with 11.2 per cent. Tuberculosis stands fourth with 8.4 per cent. and Dr. Murphey severely criticises the policy of the city and county for making absolutely no provision for the care of the tuberculous. Cases cannot be admitted to the hospitals of the city on account of the danger of infecting other patients and the result is that the patient is kept at home without supervision so that he can and does infect those about him. Provision should also be made for cases of pellagra, which, under present conditions must also be treated in the home of the patient even when he becomes insane.

Surface closets have been abolished in all sections of the city where adequate sewerage exists and are being removed as fast as the system is extended. Fly and mosquito work is systematically carried on and the screening of fruit stores and meat markets is enforced, failure to comply with the regulation within ten days (allowed for getting screens ready) resulting in prosecution in the Recorder's Court.

District nurses and medical service for the poor are maintained and these together with a Health Exhibit which the Board devised have proved valuable in educating the lower classes to an appreciation of the value of sanitation. The chief food inspector during the six months of his tenure of office has made a preliminary survey of the sources of milk supply and is apparently doing good work in the education of the dairymen, both by suggestion to individuals and by the formation of a dairy school for which he has prepared a series of lectures. Inspection of markets, bakeries, and restaurants is also maintained although more men and money are needed on account of additional work occasioned by new ordinances. Brief reports of the work of the city laboratories for chemistry and for bacteriology and pathology are included as well as a statement of the work on medical inspection of schools.

The report is printed on good paper so

that it presents an attractive appearance and the last ten pages are devoted to a statement by the secretary of the Chamber of Commerce setting forth the advantages which Augusta offers as a business or residence city.

DEPARTMENT NOTES.

Right of Health Department to Confiscate Milk.

"The right of the Department of Health to destroy or confiscate milk without notification of the owner, and without giving him an opportunity to defend the purity of his product has never been tested legally, although it has at times been the subject of comment and discussion. A decision, handed down May 14, 1913, by the Supreme Court of the State of Wisconsin, upholds the Department of Health in such confiscation when milk is adulterated or below standard. As a matter of fact, at the present time the department confiscates and destroys only when milk is above a certain temperature or when it contains visible dirt, these two points being capable of immediate and satisfactory demonstration. In cases where adulteration is suspected, samples are taken and submitted to chemical analysis and, upon proof of adulteration, the dealer is prosecuted. The opinion of the Milwaukee court was delivered by Mr. Justice McKenna and affirmed the judgment of the Circuit Court for Milwaukee County, from which the plaintiff had appealed."

N. Y. Medical Journal, June 28, 1913.

The Vacant Lot.

"The Health Department is interested in the vacant lot. Each citizen in Louisville should be. No doubt there is one in *your* neighborhood, that has been a source of annoyance to you for some time, with its overgrowth of weeds and unsightly accumulation of filth. Probably there are children in the neighborhood, too, perhaps sitting disconsolately on the curbstone or playing in the dusty street. Why not utilize the vacant lots and solve two problems at once? Permission to use them can usually be acquired. The Health Department would like to see every vacant lot utilized as a garden and playground. Most of them are large enough to be divided in this way. A little neighborhood coöperation will do the work. Let someone get the larger children interested. See-saws, swings, coasters, and many other things can easily be made, and the children will have a playground on their own square. The lots will thus be cleared of rubbish and cease to be breeding places for flies and mosquitoes and will add to the attractiveness of the neighborhood."

Health and Hygiene, Louisville, (Ky) Department of Health.

A Strange Typhoid Outbreak at Paris.

"Recently there was a sharp local outbreak of typhoid fever in Paris. Investigations proved that the epidemic could be traced to the recent Physical Education Congress. During the preparation of the building for the sports exhibitions, a workman joined by mistake a Seine river water pipe to a drinking water pipe. Three weeks later several cases of typhoid, mostly confined to one neighborhood, were notified. The mistake cost the lives of twenty people."

The Medical Officer, May 10.

Preventive Medicine in Indiana.

"Indiana, always alert and in the forefront, purposes to make prevention a definite duty of the medical profession, and for that purpose to organize the entire body as aids to the state health department. Legislation is proposed that puts the moral and physical welfare of the state absolutely into the hands of the doctors. Education is the means, the law its weapon, and the scientific doctors its officers.

"No special expense to the state is involved, except some additional cleric force in Dr. Hurty's office. It is proposed to divide the state into as many sanitary districts as there are physicians, making the duties of each

comparatively light. Annual reapportionment provides for changes. The duties of the physician are, to inspect in his district the children, homes, shops, public places, sewage, drainage, streets—in a word, to act as health officers. Children suffering and needing more care than the parents are able to afford are to be treated at the expense of the public. All diseases are to be reported, especially the contagious, and this includes the venereal. Those not reasonably cared for are to be isolated. Drug and alcohol habitués are to be registered, and excessive users to be published. Hopeless victims are to be isolated.

"District physicians are to inspect the plumbing, drainage, lighting, and ventilation, and the cleanliness of abodes, public places and shops. These reports are to be acted upon by the State Board of Health. The disposal of sewage, garbage, water, food, supplies, and market conditions are included. The control of drugs is also placed under the physician. The inspection of school children is extended also. They will be classified according to ability, and taught sanitation, hygiene, and anatomy, especially of the sexual organs.

"The power of sterilizing unfit males is placed in the hands of the State Board of Health. Crime will be studied, and this, with prostitution, drunkenness, pauperism, insanity, and other evils, be reduced as much as the development of the system proves to be possible.

"The Indianapolis Medical Society has accepted this program, and more than fifty of its leading members has indorsed it.

"Whether Indiana will accept so radical a measure remains to be seen. So many evils are assailed by it that the forces of darkness may be expected to rally in opposition. It will be noted that this follows the lines of the plan promulgated in these columns some time ago, to place the medical profession in the attitude of protecting the people against disease instead of waiting for its actual occurrence."

American Journal of Clinical Medicine.

Venereal Diseases and the New York Department of Health.

An important article from the pen of Dr. Hermann M. Biggs, General Medical Officer, has recently been issued by the Department of Health of the City of New York as No. 6 of the reprint series of the department, entitled Venereal Diseases. The Attitude of the Department of Health in Relation Thereto.

The requirement of notification of these diseases has already been referred to in the Journal.

Dr. Biggs states that "a compliance with the new regulations has been perhaps less general even than was the case in the beginning with reference to pulmonary tuberculosis, and the opposition has been greater."

Dr. Biggs continues to say that:

"The superintendents and the boards of trustees of some of the larger institutions of the city have failed to comply with the new regulations of the department, excusing their action on the ground that the notification of cases as required by the Department of Health involves so much clerical work that it is impossible for them to comply, as the physicians cannot do the work and no clerical staff is available for this purpose. Other institutions have declined to notify their cases because they were not in sympathy with the purpose and spirit of the regulations.

"The existence of large numbers of cases of venereal disease, and the terrible effects produced by them, is universally admitted. Still the medical boards of three large hospitals of the city have appointed committees to protest against the attitude of the Department of Health, and a joint committee representing them has addressed a communication to His Honor the Mayor, asking for his interference.

"Such opposition and such criticism were fully anticipated, and much more is likely to follow. The progress of sanitation, like the warfare of science, has been the history of a continuous struggle against opposition, carried on in the name of law, religion, personal rights, or expediency. The history of this struggle, like that of previous ones in science and sanitation, will end finally in a

long delayed success, although the difficulties of the problem presented are much greater than has been the case in most previous instances.

"Early in January of this year, a circular letter was sent to every physician in New York City, requesting him to report the number of cases of venereal disease which had been under his care during the year 1912. Up to the present time the number of cases reported is as follows:

Syphilis	13,348
Gonorrhea	24,980
Chancroid	4,331
Total	42,659

"Let it be understood that these represent only the cases reported by 1,500 private physicians out of more than 8,000 in the city and do not include those treated in public hospitals, dispensaries, etc. They naturally indicate only a small proportion of the cases actually under the care of the physicians of this city during the year. It is probable that a large percentage of these cases were in the active, infectious stage. I think that 200,000 would be much nearer the real number of cases developed in the city during 1912. These figures, however, give a very inadequate conception of the character of the problem which is presented by the venereal diseases and its enormous importance to the health, happiness, and physical welfare of the people of the city of New York."

In conclusion Dr. Biggs outlines the policy of the Department toward these diseases as follows:

"*First:* The development and extension of the system of registration as at present conducted.

"*Second*: The provision of adequate facilities for the early diagnosis and general supervision of all forms of venereal disease.

"*Third:* The institution of an extensive campaign of education in relation to sex hygiene, and the causes, prevalence, danger, and results of such infections and the means for their prevention and treatment.

"*Fourth*: The provision of hospital accommodation for such cases as constitute a menace or which can find no facilities elsewhere for their care. . . . .

"I venture to say that when the anti-tuberculosis movement began in this city some twenty years ago, no one anticipated the vast organization of social forces that would be developed to cope with this disease. As the campaign progressed, first one and then another agency was enlisted, and as the problems presented themselves they were met in the light of existing knowledge and experience. Exactly the same situation confronts us in the control of the venereal diseases, and while the initial steps seems quite clear, I do not for a moment hesitate to say that the further development of the campaign must await further knowledge—knowledge to be obtained only through the results of experience."

The "Fever Ship."

"In March, 1912, Director Sawyer reported to the Board upon a remarkable recurrence of typhoid fever on a ship, which had covered a period of more than three years. Briefly stated, a series of nearly thirty persons (members of the crew of this ship at the time they were taken ill) suffering from typhoid fever had been taken from a certain ship. Several deaths had occurred, and the frequent intervals at which these men were removed so impressed the sailors that it became difficult to maintain a full crew. The ship became known as the 'fever ship.'

"Every source of infection outside the ship was eliminated, and finally it was decided to begin with the captain and go through the entire crew in a microscopical search for a 'typhoid carrier.' This laborious task was rewarded by the discovery of one seaman, the winch driver—the ship was a lumber vessel engaged in coastwise trade—who was a carrier. This man was removed from the ship and placed in quarantine. Through the coöperation of the United States Public Health Service he was kept under observation and treatment in the San Francisco Marine Hospital for nearly six months—*not treatment and observation to benefit him, for he was already well physically,*

but treatment to render him no longer a source of danger to the public.

"At the end of this period it seemed justifiable on the basis of these observations to release him on condition that he report every two weeks. Within two months after his release three more persons developed typhoid fever on another vessel upon which he shipped as a seaman. One of this number died. Investigation showed on this ship the same conditions of a common water barrel and common cup, believed to have been the chief source of this typhoid-carrier's transfer of his disease to the first series of victims. He was again returned to quarantine and other measures which science has suggested are being tried in an effort to eradicate the typhoid bacilli from their residence in his alimentary tract. No cases of typhoid fever have originated among the crews of either vessel since his removal.

"The fine quality of citizenship which has been displayed by this man throughout the past year of quarantine-imprisonment can not be too highly praised. Here is a man who five or six years ago contracted typhoid fever and paid the cost in illness and who subsequently through no fault of his own, has become a menace to the health of the general public. Had his occupation been on land, and one which caused him to shift from town to town, it is probable he would never have been detected under the imperfect administrative health organization our cities and counties maintain. Our records would only have shown a steadily lengthening series of 'sporadic' cases of typhoid fever which no one could explain. Instead of the thirty-one known cases and five deaths caused by this man we might have actually had many times this number of unknown cases due to him.

"The human disease 'carrier' presents many new and difficult problems to the health departments. This typhoid carrier illustrates some of these problems. Shall this man be permanently quarantined unless methods can be devised for rendering him no longer dangerous to the public health? The public demands that this be done in the control of leprosy; it hesitates to require any measures in this direction in the control of tuberculosis; it refuses thus far to seriously consider adequate measures of any kind in the control of syphilis. What will be the public verdict in cases of typhoid carriers?"

Bulletin California State Board of Health, April, 1913.

The Standard for Milk.

"The standard for milk now in vogue in Ohio is based upon the results of analysis of many samples taken from the numerous varieties of milch cows and is simply the composition of the poorest possible milk that a cow in a normal healthy condition can give, viz., 3 per cent. butter fat, 9 per cent. solids not fat, 12 per cent. total solids. These standards have been adopted quite generally by the municipalities of the State, but in some cases there seems to have been certain exceptions; that in the months of May and June a standard of 2.8 per cent. butter fat, 11.50 per cent. total solids, 88.5 per cent. water is allowed. The records of analysis of many samples of milk during the months of May and June in this laboratory show a standard such as the above to be ridiculous. This standard seems to have been allowed on the theory that the great succulency of the grasses and food during these months naturally diluted the milk and was therefore weaker when obtained from the cow. This condition is rare, but on the other hand it permits those who dilute and standardize their milks to reap an abundant profit during these two months by removing the fat or increasing the volume, by the addition of skim milk, etc. The original standard, in my opinion, is low enough and should maintain throughout the year."

Wm. McK. Reed in the Toledo Sanitary Bulletin, July, 1913.

Better Tenements.

"Remarkable strides have been made in the enforcement of Louisville's splendid Tenement House Law since the appointment of Special Tenement House Inspector James Montgomery. No less than two hundred and fifty bad tenements have been put in livable condition as to better roofing, paper-

ing, plastering, painting, adequate toilet facilities, sufficient water supply, overcrowding, etc., since his appointment in December, 1912.

"The housing problem is a many sided and difficult one, and fraught with many evils to the community; evils of a social, economic, sanitary, civic and moral nature, and its solution is dependent upon many things—proper laws, capable officials, the social worker, education, an interested public, the property owner and the tenant, and it requires coöperative work.

"All tenements, which also covers the better class of apartment houses which have been erected since the passage of the tenement house law, have been modeled strictly according to its requirements, as the plans have been closely scrutinized by the Health Department before a permit was issued.

"The main problem now is in dealing with those tenements which existed prior to its passage. It is with these wretched dwellings located on the dim, grey streets, behind other streets, with which the Health Department is now busy, and it is the aim to abolish as many of these tenements as possible. Many of them can never be put in proper repair, and when such a case is found, the owner is instructed to have the premises vacated.

"Another difficulty lies in the fact that it is not always the owner who is responsible for the deplorable conditions found. Often he is willing to put the house in repair, but the tenants tear down as fast as he builds up—burn the new steps and fences, knock holes in the new plaster, and tear off the new paper. Education here is the only means by which anything constructive will be accomplished, and education of the children is, in the writer's opinion, the most potent influence.

"As long as it is necessary to pass laws and issue orders to compel persons to clean and ventilate the places they live in, so long are we far distant from that pinnacle of civilization we like to brag about."

Health and Hygiene, Department of Health, Louisville, Ky., July, 1913.

Picture Palaces and the Spread of Disease.

"Last year in the borough of Nelson school closure was resorted to during an epidemic of measles, and this brought into prominence a new factor in the present-day facilities for the spread of infection, *i.e.*, the picture palaces. These exhibitions,' writes Dr. A. Pollock Millar, M.O.H., 'gather together crowds of children nightly in conditions much more favourable to the spread of infection than modern school premises offer, and it is a matter for serious consideration by authorities responsible for the health of the public whether circumstances warranting a resort to school closure should not also permit of the compulsory exclusion of children of school age from these exhibitions for a like period."

The Medical Officer, May 10.

Pardonable Pride.

Asheville, N. C., is proud of its 1912 typhoid fever record and the following clipping taken from the *Bulletin* of the Health Department would certainly indicate that this pride was justifiable.

"It is a great pleasure for us to state that death from typhoid fever is represented by the minus sign in Asheville for the last twelve months. We did not have a single death from typhoid fever during the year 1912.

"The number of people sick with typhoid fever in Asheville is also worthy of mention. We had only fifteen cases to develop in Asheville during the year 1912. Ten of these were people whose homes were here, but who were in business away from here, and were taken sick and came home on that account, being reported ill with typhoid fever within ten days after their return to the city. These cases are spoken of as 'imported.' The other five cases developed in the city and we were unable to trace the cause.

"The average death rate for typhoid throughout the United States for 1910 was 23.5 per 100,000, at which rate we would be due to have about five deaths, or to be accurate 4.7 deaths.

"However, typhoid fever is more prevalent in Southern cities and the death rate is much

higher. The average death rate for North Carolina cities in 1900 was 57.7, at which rate we would be due to have 11.5 deaths from typhoid, more than twice as many as we had cases develop in 1912. For 1910 the death rate in North Carolina cities had been reduced 2.2, the death rate being 55.5, at which rate we would be due to have 11.1 deaths from typhoid which is still 200 per cent. more, (not than our deaths for we had none in 1912) but 200 per cent. more deaths from typhoid in 1910 than we had cases develop in Asheville last year. The average death rate for typhoid in North Carolina cities seems to be about the average for Southern cities."

Trade Unions and Health Conditions.

The following article clipped from the English "Medical Officer" gives a rather valuable suggestion to health officers in this country.

"A welcome sign of the times is the increasing tendency of trade unions to interest themselves in matters of sanitary administration. Members of the public health service naturally rejoice at any evidence of the awakening of intelligent criticism, which is bound to assist them in securing the adoption of measures they know to be necessary to the well-being of the community. A recent example of the vigilance of trade unions comes from Raunds, in Northamptonshire, where the district council has been inquiring into certain representations forwarded by the National Union of Boot and Shoe Operatives. The union in a courteous letter had alleged that tuberculosis was increasing in the district, especially among young persons, and suggested that this was due to insanitary conditions in workshops and factories. In this particular case, Dr. William Mackenzie, M.O.H., was able to show that the union was misinformed, and that not only was there no increase in the number of cases of phthisis in Raunds, but that actually the district compared favourably with other similar areas. In the course of a discussion arising out of Dr. Mackenzie's report, certain statements were made regarding the habits of some members of the working classes which anyone acquainted with factory conditions must know to be well-founded. It was alleged that the decent sanitary conveniences provided by employers are grossly abused by some of the workmen, who spit about the floors and otherwise render these places filthy and repulsive. We commend this matter to the notice of trade unions, who can do so much to put an end to conditions that must be very distressing to self-respecting working men. We often feel that the British working classes, who in so many respects are an example to the rest of the world, are grossly lacking in consideration towards their neighbours. To take only one example, we would refer to their habit of travelling backwards and forwards to their daily labours in clothes covered with oil, paint, whitewash or mud, regardless of the fact that they share the same public conveyances with those who are obliged to go about in black coats or soilable dress materials. On the Continent working men show a less selfish spirit, and a cleanly suit of overalls put on over dirty clothes enables them to enter train or omnibus without injury to the garments of their fellow travellers. With the awakening of a health conscience in the trade unions now becoming manifest we may hope that such abuses as we have mentioned may quickly disappear."

PUBLIC HEALTH NOTES.

Plague Prophylaxis in China.

"A German navy surgeon tells how he kept the plague out of Kiaochau, the Teutons' look-in in China. The boundaries were guarded by a barbed-wire fence with 300 men back of it; the water-front, by guard-boats and searchlights. But one opening for admissions was left. At the market, buyers and sellers were separated by two wire fences five feet apart. All incoming travelers were examined at quarantine and detained under observation for five days. Trusty persons then admitted had to report daily for five days more. Doctors, attendants and sextons were protected with motor-goggles, cotton-masks over the nose and mouth, a hooded suit with gauntlets, and long boots. On leaving the ward, a spray of sublimate solution was applied and the clothes were well brushed. The suit was then shed and soaked in an antiseptic lotion. Then he was allowed to go free."

American Journal of Clinical Medicine, June, 1913.

The Smoke Nuisance.

Agitation for the abolishment of the smoke nuisance usually meets with opposition from the manufacturers who object on the ground that it would add to their expense to introduce smoke consuming devices. In view of the numerous anti-smoke crusades now going on the following figures compiled by the University of Illinois Engineering Experiment Station may be of interest. A so-called "smokeless boiler" was used and the tests showed that the density of the smoke emitted was well within the limits of the strictest ordinance likely to be passed. The tests of efficiency were made with six different coals and each was tried in both the smokeless and the regular type of boiler. The detailed results of the test follow:

	Smokeless efficiency Per cent.	Regular efficiency Per cent.
With Iowa slack	47.1	39.5
Iowa slack	57.9	43.3
Illinois mine run	59.3	48.5
Illinois nut	67.0	56.1
Illinois lump	74.3	65.2
Pocahontas	74.9	57.2

There is a general campaign for smoke abatement now going on in England especially in the large manufacturing cities. Dr. W. L. Hawkley writing in *Public Health* presents a thorough discussion of the subject and closes with these recommendations:

"1. That those engaged in the Public Health Service do their utmost to encourage public interest in the subject of atmospheric purity, by advice to their authorities; the introduction of popular lectures, exhibitions of smoke prevention appliances, and classes for those in charge of furnaces.

"2. That Local Authorities should, if possible, establish classes on the lines of those already held in London, Liverpool, Manchester and Glasgow for the instruction of engineers, firemen and others concerned with boiler management.

"3. That a certificate of proficiency should be granted to those who have attended such a course and who have passed a simple examination at its conclusion.

"4. That employers should be encouraged to require the production of such a certificate from any person applying for employment as an engineer or fireman.

"5. In places where smoke inspectors do not exist, they should be appointed. They should be men of special experience and have had instruction in theoretical and practical considerations of smoke abatement.

"6. The price of gas and electricity for factory and domestic use should be kept as low as possible.

"7. In offices, flats, public buildings and institutions a scheme of central heating and hot water supply should be insisted upon.

"8. Support should be given to the Bill promoted by the Smoke Abatement League when it is introduced.

"9. The Local Government Board should enforce their powers with regard to the pre-

vention of smoke under existing legislation where Local Authorities refuse to take any steps in the matter."

Pellagra.

Dr. William H. Harris of New Orleans writing in the *Journal of the American Medical Association*, June 21, gives a preliminary report on the experimental production of pellagra in the monkey. While the experiments hitherto completed are not planned to throw light directly on the modes of infection among humans, they are certainly a step toward the solution of the problem.

The infectious material was prepared by macerating and filtering portions of the skin, alimentary tract, brain, and cord of a human patient dead of pellagra and the inoculation was given in all cases intercranially, subcutaneously and intravenously. Typical lesions and ultimate death were produced, but only after an incubation period of several months. Dr. Harris draws the following conclusions:

"These experiments would indicate that pellagra may be transmitted to the monkey (*Macacus rhesus*) by means of a Berkefeld filtrate derived from the tissue of the human subject; at least, the animals develop all the essential clinical signs nd symptoms together with the pathologic picture discerned in the disease in man. Furthermore, they suggest that the etiology of pellagra is a filterable virus or a micro-organism capable of passing through the pores of certain Berkefeld filters. The details of this work and the further experiments which have been undertaken with a view of determining the nature of this filtrate and other phases of the problem will appear in a subsequent publication."

Municipal Laboratories.

A short article by Dr. Park, Commissioner of Health at Rockford, Illinois, deals with the purpose and value of a municipal laboratory. He closes with these words of advice to city governments:

"Do not be deceived into thinking that this is a subject that has been overdrawn. Remember that it is war—grim, bloody war—between the armies of Life and those of Death. Cities which yearly spend thousands upon thousands of dollars for such luxuries as parks and libraries, should not turn a wry face when the question of appropriating for a laboratory comes up.

"Let not the laboratory be considered merely the study-room of the impractical, pedantic savant—let it rather be the battlefield upon which the shining sword of Science fights for human life and health."

Milwaukee's Tuberculin Test Ordinance Upheld by Supreme Court.

What is probably one of the first and at the same time most far-reaching decisions dealing with tuberculosis ever given by the United States Supreme Court, was recently handed down, when Milwaukee's famous tuberculin test ordinance was upheld by that body. For the first time in the history of the United States, at any rate, the question of whether a city or state may prevent the sale of milk from cows that have not been subjected to a test for tuberculosis has been decided by the highest tribunal in the land.

The Milwaukee Tuberculin Test ordinance was drawn by Mayor Bading when he was health commissioner of that city in 1907, and after a year's fight with the dairymen, the ordinance was adopted by the common council in 1908. The association of dairymen, at once took the matter to the Circuit Court on questions including the reliability of the test, and after a long period in which data on the subject was gathered in many eastern laboratories, the case was tried and the ordinance upheld.

After defeat in the Circuit Court, the case was carried to the state supreme court, and then to the United States Supreme Court, where the final decision is now given. The court upholds the following contentions of the city: That human beings are subject to infection from bovine tubercle bacilli; that the bovine bacilli have as great disease producing power as the human bacilli have for human beings; that the bovine bacillus produces the same pathological condition in the human body as the human bacillus; that tuberculosis is transmissible to human beings

through the use of milk and its products as food; that tuberculosis prevails in cattle in the vicinity of Milwaukee; that bacterial examinations are not sufficient, and that while the tuberculin test is not absolute, it is the only reliable and trustworthy diagnostic agent for determining the presence of tubercle bacilli; that a tuberculin test applied to cows outside of Milwaukee, from which cows the milk of the city is drawn and shipped into the city, is a reasonable requirement. The injunction against the application of the test is dissolved by the decision.

Fall in Berlin's Death Rate.

A remarkable paper showing the decline of the tuberculosis death rate in Berlin is contributed by Prof. A. Kayserling in "Tuberculosis" (Berlin) for April. The paper is entitled "Statistische Beitraege zur Tuberkulose—Assanierung der Stadt Berlin."

Professor Kayserling goes back to 1822 for his records although most of his paper deals with the period between 1855 and 1911. He distinguishes two periods in the course of the tuberculosis mortality curve. In the first cycle between 1855 and 1886 there was no decided decrease in the tuberculosis death rate, it remaining about 32 per 10,000 living throughout that period. With the year 1887, however, the curve begins to show a decided drop, which continues more or less regularly up to 1911. In 1886, out of an average population of 1,339,956 in Berlin, 4,318 people died of pulmonary tuberculosis, while in 1911, with an increase of 730,000 population to 2,071,940, the number of deaths was decreased by 599 to 3,719. The death rate in 1911 was 17.95 per 10,000 population as against 35.11 in 1855 and 29.72 in 1887. Professor Kayserling finds also that the decrease in the last twenty-five years is manifest for both sexes in every age period with the exception of females of more than 70.

Mosquito Device.

"An instrument for the detection of the direction of flight of adult mosquitoes has been invented by Mr. E. Frederick Quimby, division inspector in the Department of Sanitation. It consists of a metal frame holding four plates of glass each 12 by 12 inches in size, placed upon a tripod. The glass plates are held stationary at right angles to each other so that when the instrument is set up, they point north, east, south and west. To catch the mosquitoes a coat of tanglefoot, composed of one-half pound of rosin to one liter of castor oil, is prepared, and when applied to the glass is practically transparent.

"The first experiment with the instrument was made west of oil tank No. 62, at Mount Hope, on March 8. It was set up at 6.30 p. m. The first mosquitoes were noticed at 6.35 p. m., and were *culex* coming from the east in a straight line. The *anopheles* flight followed at 6.40 p. m. from the same direction, but these mosquitoes were moving low and slow in zigzag flights, as if seeking lulls in the wind. The first mosquitoes caught on the plate were noted at 6.55 p. m. At this time the wind was blowing at a velocity of 19 miles an hour from the north, but between 7 and 8 o'clock it increased to 25 miles an hour, still from the north. The first mosquitoes were caught on the east side of the south plate, but a few minutes after 7 o'clock, adults were caught on the north side of the east plate. The flight stopped at 7.15 p. m., and no adults were caught until 8.05 p. m.

"An all-night test was made on the night of March 13 and morning of March 14 on a point of land, situated between the French and East Diversions, about 1,000 feet west of the power house at Gatun. During this experiment, the following points were brought out: That the adult *culex* and *anopheles* flew on the quarter of a 17 to 19-mile wind; that the evening flight occurred between 6.10 and 7.10; that there was a complete lull in the flight after 7.10 o'clock; that there was a return flight between 5.50 and 6.40 in the morning, also on the wind's quarter; that the mosquitoes fly much higher and swifter in the morning than they do at night; and that, with possibly few exceptions, only adult females are in flight.

"On the night of March 19, and morning of March 20, another all-night test was conducted at the same place as above. During this experiment an *anopheles* mosquito was

caught for the first time on the opposite side of the plates from the direction of the flight. This adult was a male, the only one captured during the experiments up to that date. It is believed that this male may have been flying about aimlessly when caught. The instrument has proved to be useful in locating breeding places by eliminating the area facing the plates that do not show a catch. It also identifies the species of mosquitoes in the dark, as well as in the light, thereby determining the direction of flight, if any, during the night. Experiment shows that there is no direct flight during the night, after a certain period. Further this is the first time that a return flight has been recorded on the Isthmus; and it was shown to take place within a period."

The Canal Record, June 13, 1913.

Vaccines for Whooping Cough.

A valuable paper on this subject from Dr. E. Mather Sill appeared in a recent number of *American Journal* of Diseases of Children. Dr. Sill states that:

"Thirty-three cases of whooping-cough were treated with the pertussis vaccine, and in all the effect of the vaccine was to diminish markedly the number and severity of the paroxysms and the amount of vomiting.

"Absolutely no untoward effects from the use of the vaccine were noted. There were no complications in the cases in which the vaccine was used. No abscess formation, or even slight temporary inflammation or swelling at the site of the injection, and no general constitutional symptoms occurred. The longest time any of the children coughed was twelve weeks and four days. The longest time any child coughed after it was put under vaccine treatment was nine weeks and one day, the average length of time being four and one-half weeks. The injections were given every two or three days in most of the severe cases, and in the very severe cases every day for a few days, until the symptoms were relieved; the milder cases did not receive the vaccine so often nor so much at a time.

"The cases that were seen early in the attack, before the paroxysms had attained their height, seemed to respond more quickly to treatment and their course was shorter. In all cases, however, after one to three injections, the number and severity of the paroxysms was markedly lessened.

"Some children seemed to respond better to treatment than others, and I attribute this to the fact that the dosage was given irrespective of the age; therefore, the younger children got a larger dose proportionately, and as a rule these latter were the ones that responded most quickly to the vaccine and had the shortest attacks after treatment was begun. This fact is important, since (heretofore) these young babies are so apt to have pneumonia complicating or accompanying pertussis, with fatal results."

In connection with the use of vaccines for prophylactic purposes Dr. Sill makes the following comment:

"A very interesting fact is that prophylactic treatment was instituted by giving immunizing doses of pertussis vaccine to children in a family in which one of the children was under treatment for whooping-cough. These children were watched over a period of two months, and although they had never had whooping-cough and were constantly exposed to the disease, did not contract it. It would seem, then, that the vaccine confers immunity to the child injected with small doses. One child of 5 years was given four injections of twenty million bacteria each, over a period of one month; another in the same family, 3 years of age, got nine injections of twenty million each, over a period of one month; neither child developed pertussis."

Mortality According to Marital Condition.

"The State Health Department has been collecting statistics regarding the mortality rates as connected with the marital condition during the past three years outside of Buffalo and New York City. The most obvious fact indicated by these statistics is that the death rate for husbands is much lower than for single men at each age group except the highest, where it is about the same. The percentage of difference is the greatest at the ages 30–39 and 40–49, where the death rate of husbands is somewhat less than one-half that of bachelors. The table shows that the

death rate of widowers and divorced men is considerably higher than that of husbands of the same age, and between 30 and 80 years not far different from the death rate of bachelors of the same age. The table shows further that the death rate of wives is lower than that of single women of the same age, the only exception being between the ages of 20 and 29, which is perhaps in part due to the influence of child bearing at those years and in part to the greater average age of wives in that group. The mortality of widows and divorced women is as a rule higher than that of spinsters. From the standpoint of mortality marriage is of less benefit to women than to men."

New York Correspondence, Journal of the American Medical Association, July 12.

Purification of Oysters.

"Of all the means for preventing the use for food of contaminated oysters, 'stabulation' or deposit of the oyster in pure water for sufficient time before their use seems by far the simplest and most rational. Fabre-Domergue, inspector general of the fisheries, proposes the use for this purpose of basins fed with filtered water, removed often enough to insure complete evacuation of the liquid contained in the shells and of the matter in their digestive apparatus. He recently read a paper before the Académie de médecine on the results obtained by this procedure. It may be considered as an established fact that the procedure insures the purification of the mollusk in six or seven days and that it makes it unnecessary to fear any infection from them."

Paris Letter, Journal of the American Medical Association, July 12.

Growing Interest in Social Surveys.

"Interest in the social survey as a means toward city improvement grows apace. This is definitely shown by the fact that citizens and organizations in as many as 100 cities, scattered through 34 states, have requested the Department of Surveys and Exhibits of the Russell Sage Foundation either to come and survey them or to advise them in starting a local survey movement. Many of these requests are backed by the local commercial organizations, chambers of commerce and boards of trade. The value of the survey from a business point of view—in giving the city commercial advantage through making it a better, healthier and more comfortable place to live in—is receiving increasing recognition in these quarters.

"Two kinds of field work in surveys have been engaged in by the department—'pathfinder's surveys' and 'preliminary surveys.' The former are quick diagnoses of local conditions showing the need of the longer and more intensive survey. They gather enough local facts to indicate the main lines of investigation which should be taken up later, the probable time necessary and the probable cost. The preliminary survey is aimed at three kinds of results: First, to furnish a sufficient body of local facts to permit the planning of an intelligent program for community advance for the next several years; it not only shows liabilities, but community assets—the forces to build on and to build with, as well as what to build. Second, it is a means of enlisting public support for measures which champion human welfare. Third, it collects sufficient data to point out the problems which need thorough or continuous investigation."

The American City, June, 1913.

Hygiene and Housing Congress.

"The fourth International Congress for the Hygiene and Salubrity of Dwellings will be held at Antwerp from August 31 to September 7, the three previous Congresses having been held at Paris, Geneva and Dresden. The term 'dwellings' is understood in its widest sense, and is held to include all premises used for a shorter or longer time by human beings. The Congress will be divided into the four sections: Hygiene of Emigrants, Colonial Hygiene, Hygiene of Ports and Ships, and Development of Towns from the Hygienic Point of View. In the first section the questions down for discussion are: Transport by rail from the place of origin of emigrants, medical inspection on arrival, lodging on land, hotels, private houses, boarding-houses, foundation of special house-complexes or of caravansaries, advantages and inconveniences, and transport by ships, drinking

water, clothing, and night-quarters. The subjects specially to be considered in the second section are: Private dwellings, collective dwellings (mining enterprises, plantations, and so forth), and infirmaries and hospitals. The section specializing on the hygiene of ports and ships has on its programme for discussion: Means to prevent the contamination of navigable waterways, prophylactic measures against the introduction of exotic contagious diseases, sailors' homes, passenger ships, and men of war. The fourth section will consider the point of expropriation on account of insalubrity, a subject which is also to be discussed at the immediately following meeting of the tenth International Congress of Cheap Dwellings at The Hague. The President of the Congress will be Dr. Victor Desguin, the President of the Royal Belgian Society for Public Medicine, and it is expected that, as on the three previous occasions, it will be attended by representatives of the principal foreign Governments and municipalities. Arrangements have been made for the International Exhibition at Ghent to be visited and for a tour in Holland after the Antwerp meeting. Applications for membership of the Congress should be addressed to the treasurer, Mr. A. Cols, Willem Tell Street 3, Antwerp."

The Medical Officer, June 21.

Air Conditions in Schools.

"A few sanitarians have already begun this study of existing air conditions in school houses. A notable report, preliminary, it is hoped, to still more extensive studies, was presented last month to the Committee on School Inquiry of the Board of Estimate of New York City by Charles J. Armstrong, Consulting Engineer, Prof. Charles Baskerville and Prof. C.-E. A. Winslow of the College of the City of New York. This describes the results of investigations made in five school buildings, two in Manhattan, two in Brooklyn, and one in the Bronx. Between April 19 and June 7, 1913, many observations of temperature, humidity, dust and bacteria were made. The main conclusions from these studies of indoor air are stated in the report as follows:

"(1) Overheated and over-moist air is the principal cause of discomfort and injury to health in ill-ventilated rooms.

"(2) In four of the five schools studied the average temperature was over 70 degrees, indicating a distinctly undesirable condition of affairs.

"(3) In the three new school buildings, not in crowded districts, 15 per cent. of the records showed comfortable conditions outside and overheating within, while in the two old buildings located in tenement districts this percentage rose to 54 per cent.

"(4) Bacterial counts show a range of 0 to 150 colonies falling on a plate of 9 square inches in three minutes. Of the 30,000 colonies on the plates only ten were characteristic mouth organisms, indicating that most of the bacteria present are harmless.

"(5) Dust counts in the school room air ranged from less than 200,000 to about 2,000,000 particles per cubic foot. The average for individual schools ranged from 610,000 to 760,000, while the average for outdoor air was between 800,000 and 950,000. The highest indoor values were in the two old buildings in tenement districts.

"Too much stress cannot be laid upon the cleanliness of the air forced into a building. Recent experiments made by Melville C. Whipple, Instructor in Sanitary Chemistry in Harvard University, have shown that air near the street level in our crowded cities is not fit to be distributed indoors unless it be first purified. The upper air is much cleaner and contains fewer dust particles and fewer bacteria. This lends some weight to the arguments of those who advocate window ventilation in place of mechanical circulation. But air can be purified and ventilation plants can be designed so as not to be deranged by the occasional opening of a window. Thus far ventilating engineers have given all too little attention to the quality of the air supply from the standpoint of cleanliness. They would do well to follow the methods of the water supply engineer who plans to furnish water in its natural condition when it is sufficiently pure and wholesome, but who does not hesitate to utilize an impure supply after adequate purification.

"One of the interesting facts brought out by Professor Winslow's studies of air bacteriology was the comparative absence of harmful bacteria in the air of school rooms. Out of 30,000 colonies observed, only 10 proved to be of a type commonly found in the mouth, or, in other words, most of the bacteria found were probably harmless. But considering the large amount of air that is drawn into the lungs of a human being during the course of a day, even a small percentage of objectionable bacteria in the air may be not without significance. The report states that, on an average, school room air contained about 700,000 dust particles per cubic foot. How enormous, then, the numbers of dust particles inhaled in the course of a day! And how important it is not only that the air forced into a building be clean, but that proper methods of floor cleaning and dust removal be adopted."

George C. Whipple in the American City, July, 1913.

Treatment of Pediculosis Capitis.

The *New York Medical Journal* makes the following comment on an article in the *Lancet* which should prove of interest to those who have to handle the problem of pediculi in the public schools.

"Arthur Whitfield, in the *Lancet* for December 14, 1912, describes a procedure by which pediculi of the head in female children can be rapidly exterminated. The patient is placed on her back on a bed, with the head hanging over the edge, and the hair resting in a basin placed on a chair. The following solution,

℞ Phenolis, ...℥iii (12 grammes);
Aquæ, ...℥i (500 grammes).

is then poured over the hair into the basin and sluiced backward and forward until the whole of the hair is thoroughly soaked with it. Saturation of the hair over the ears and at the nape of the neck should especially be secured, since these parts are the sites of predilection of the parasites. The sluicing is to be carried out for ten minutes by the clock. The hair is then lifted from the basin and allowed to drain, but is not dried or even thoroughly wrung out. The whole head is then swathed with a thick towel, or better, with a large piece of flannel, which is fastened up to form a sort of turban. The head is allowed to remain thus for an hour. It can then be washed or simply allowed to dry, as the phenol, being volatile, quickly disappears. At the end of this period every pediculus and, what is more important, every ovum, is dead. The hair itself is not in the least damaged."

This method has met with so much success where it has been tried in the English schools that it is being generally adopted. As an additional means of prevention parents are supplied with free disinfectants to disinfect hats, clothing, beds, bedclothes, towels, etc. In some cases a man is sent to spray the rooms and bed with a disinfectant.

Cigar Cutters.

"The attention of the bureau has been invited to the danger of the spread of disease through the automatic cigar cutter which one finds so commonly on the counters of cigar stores, drug stores, and other places where cigars are sold. It is a habit among many cigar smokers on purchasing a cigar to place it between their lips while paying for the purchase, the smoker then putting the moist end of the cigar in the cutter. This would seem to be a very effective method of bringing about the interchange of mouth secretions, and possibly the spread of infection. It is suggested that the use of such automatic cigar clippers should be avoided by the public because of the possibility that disease may be spread by them by reason of the nature and manner of their use."

United States Public Health Reports, July 11, 1913.

Disinfecting Laboratory Wastes and Autopsy Washings.

Dr. W. D. Fullerton writing in the *Cleveland Medical Journal* comments on the peculiar inconsistency in the methods of supposably trained and careful workers by which the washings from autopsy tables and laboratories are allowed to run directly into the sewers with a disinfection which is often superficial and in some cases wholly absent. He suggests an attachment to the common table by which all washings drain directly

into a can of water which is kept boiling. He has experimented with various methods and submits the following conclusions.

"1. It is grossly negligent and inconsistent with modern medicine to contaminate sewage with infected autopsy washings, and thereby frequently to expose entire communities to infection, directly or indirectly.

"2. The washings from every autopsy where an infection is present should be sterilized, by one of the methods suggested or otherwise, before consigning to the sewer.

"3. Sterilization by heat, when all cases are considered, is the most rapid, thorough and convenient and accomplished with least labor.

"4. If a supply of live steam be not constantly at hand, natural or artificial gas is the cheapest means. When these methods cannot be employed Liquor cresolis compositus or formalin are the best agents to use, though other disinfectants may be employed."

Purified Advertising.

Following in the steps of the ordinances preventing the misbranding of food and drugs and in line with the fight against fake "cures" for consumption and all other ills to which the human body is heir comes the following note of progress from *Municipal Engineering* for July.

"An ordinance prohibiting untrue and misleading advertising has passed the Los Angeles city council. This ordinance gives those who have been fighting for honest publicity an efficient weapon with which to force their object.

"This ordinance follows closely and is modeled on the famous 'Printer's Ink' statute, drawn by Attorney Sims of New York City, and already is a state law adopted in Washington, Minnesota, North Dakota, Indiana, New Jersey and Nebraska. It makes it a misdemeanor for any firm, person or corporation, to make or disseminate any assertion or fact concerning merchandise or service which is untrue or misleading. It covers every possible avenue of publicity, including newspapers, magazines, circulars, form letters, open publication, billboards, signs, labels, electric signs, window cards or by any advertising device or proclamation. A fine of from $25 to $500 or an imprisonment not exceeding 180 days or fine and imprisonment is provided for violation.

"For more than a year the advertising club has been working with the backing of more than one thousand leading business men and more than a half dozen of the best civic organizations for some law which would put a stop to the fake sales that have often been carried on in Los Angeles. During the past few months nearly a score of prosecutions have been brought chiefly against fake auction sales and clothing concerns. At the present time the operations of these classes of business houses have been practically stopped and with a new ordinance in good working order it is expected that fake advertising will be put a stop to for all time."

Sterilization of Milk by Electricity.

"Towards the close of 1911 Alderman Shelmerdine, chairman of the Infant Life Prevention Sub-committee of the Liverpool Health Committee, approached the bacteriological department of Liverpool University with the view of ascertaining whether electricity could be satisfactorily utilized for the sterilization of milk, and whether such a process possessed any advantages over the existing system of pasteurization. The department forthwith devoted considerable time to the task of evolving suitable apparatus for the conduct of experiments. Twelve months later, Dr. J. M. Beattie, the city bacteriologist, was able to inform Dr. E. W. Hope, M.O.H., that the results obtained justified the health committee in recommending the city council to instal a small electrical plant in the bacteriological laboratories in order that more experimental work could be carried on. The plant was installed by the city electrical department and handed over to the university some three months ago. The sterilizing process, apart from the engineering requirements, is simple in character. The milk is allowed to enter at one end of a tripartite tube of definite size from a known fixed level, and during its passage through the tube, which occupies a known time, is acted upon by the electric current.

"During the last three months further trials have been conducted by the bacteri-

ological department of the university, and in the course of the last few days Dr. Beattie has issued a report which bears testimony to interesting results.

"Dr. Beattie asserts that the electrical method of sterilization is more economical than, and free from some of the objections urged against, the older method. He points out that the invariable result of the electrical experiments was the complete destruction of all colon bacilli and bacilli of similar nature, with an enormous reduction in the total number of bacteria of all kinds. 'We have proof,' he says, 'that the organisms (*B. coli* and its allies) which are chiefly responsible for summer diarrhœa among children, are killed, and that milk sterilized by this process is rendered eminently fit for infantile use. The keeping qualities of the milk are, moreover, very greatly improved. One sample treated almost three months ago and kept in a sterile corked bottle at room temperature is still not clotted, while samples kept at warm temperature—68 to 70 degrees Fahrenheit—did not go bad for over ninety-six hours, and even then were not clotted.'

"It was further established, as a result of the experiments, that the nutritive properties of the milk had not been in any way affected by the electrical treatment, nor was the taste of the milk in any way altered. This is in marked contrast to the result of sterilization by heat, which is apt to produce undesirable chemical changes.

"Dr. Beattie tested the effect of the electrical system on tubercular milk, and although further experiments in this direction are at present in progress, declares that already there is undoubted evidence that even the tubercle bacillus can be destroyed by this method. Two series of experiments with tuberculous milk have just been completed. Reporting on these, Dr. Beattie observes that the number of bacilli inoculated into the milk was far in excess of the numbers which are usually found in any sample of tuberculous milk. The tests have proved that the tubercle bacillus can be with certainty destroyed in any sample of milk which has been sterilized by this process.

"The report of the city bacteriologist has been submitted to the Infant Life Preservation Committee, who are so satisfied with the result of the experiments that they contemplate installing an electrical sterilization plant at their depôt for the electrical sterilization of all milk sold by the corporation. In due course the report will come before the notice of the city council. Meanwhile we are indebted to the *Liverpool Daily Post* for the facts given above."

The Medical Officer, July 12, 1913.

The German Birth-Rate.

An article on the falling birth-rate in Germany which appeared in the *Zeitschrift fur Medizinalbeamte*, 26 February, 1913, presents some interesting points which are referred to in a review in *Public Health* for June, 1913.

"The author has considered the question of the falling birth-rate in Germany, mainly in relation to a district of 102,000 inhabitants, with which he is officially connected. He finds a very definite decline from 36.9 births per 1,000 of population in 1885 to 26 in 1911.

"As reasons for this decline he lays stress on the increased cost of living and of rearing children; the increase in female labour; the prevalence of a Malthusian spirit; the excessive anxiety both of the laity and of the medical profession as to the possible influence of pregnancy on intercurrent disease; the influence of alcohol and of sexual disease; and, fianlly, the widespread adoption of artificial means of preventing or of terminating pregnancy.

"As preventive measures he suggests (*a*) that the sale of drugs for producing abortion should be made illegal; (*b*) that the sale of preparations for preventing conception should be limited to pharmaceutical chemists, and then only when a medical certificate is presented; (*c*) that such supervision of housing conditions shall be exerted as shall prevent large families from being handicapped in their attempts to get house accommodation; (*d*) measures against alcoholism and sexual disease; (*e*) a tax on childless couples and on small families, with due regard to the duration of married life, the proceeds to be paid to the support of those who have large families."